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THE INDICTMENT OF THE TONSIL.*

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An indictment is the formal and official declaration, in writing, that an accused person has committed a crime. The grand jury of the state makes inquiry concerning the conditions existing in each county and reports to the court having jurisdiction in that county the crimes committed within its boundaries. This report, called in legal terms the indictment, names the accused person, describes his offense, specifies when and where it occurred, and appends the testimony by which the charge is sustained. The witnesses who give this testimony speak under the highest sanction and greatest responsibility. They must be rational, capable of intelligently comprehending the nature of the crime; they must have personal knowledge and clear recollection of the facts to which they testify; most important of all, they must be truthful. If their veracity be successfully attacked, they are ignored.

The indictment is an evolution due to experience in the administration of justice during many generations. Its form

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and its method—dignified, logical, convincing—are endorsed by the consensus of opinion in civilized countries, and they may be employed with much advantage when we are dealing with the examination of facts and the field is not jurisprudence, but medicine; and the inquiry relates not to persons breaking the laws, but to organs disseminating infections.

By following the analogy of the legal procedure regarding charges and proof, I hope to make it clear that the conclusions reached are not of a merely theoretic or academic sort, but are demonstrations resting upon testimony of the highest kind—that the witnesses corroborate each other. Hence the statements upheld by this concurrent testimony must be accepted as fully proven.

The charge against the tonsils is that, in addition to the obstruction to respiration, deglutition and phonation obviously caused by their hypertrophy and other abnormal states, they play an important part in the introduction and dissemination of pathogenic germs. They are guilty of complicity in the causation of many morbid conditions which destroy health and endanger life. This complicity may exist when there are no local symptoms of sufficient severity to apprise the patient that the glands are diseased. Indeed, there may be not only a lack of symptoms, but also a lack of any notable change in appearance, so that a casual inspection leads to a negative diagnosis.

It is well proven that a focus of infection, very active in its deleterious work, may exist in the crypts, while the surface of the organ shows hardly anything to excite suspicion. When a patient is asked concerning trouble with his tonsils he frequently gives some such reply as this: "I feel sure they are all right. Two months ago Dr. Blank examined them and said that he saw nothing wrong." Further questioning elicits the information that the examination occupied about two minutes: the patient opened his mouth widely; Dr. Blank, a physician doing much throat work, gazed into the fauces illumined by rays reflected from the pharyngoscope, presumably inspecting both sides and also the posterior vault; then he declared that he saw nothing wrong. That was quite true: the pathogenic processes were not in sight. The examination was an instance of the old, old fallacy: "*Morbi non apparentes ergo non existentes.*"

There are some organs which are presumably healthy until proved morbid; but the tonsils are not in this class. In structure they are modified lymph glands so constituted as to be peculiarly liable to invasion by bacteria. As all food and drink passes between them, and all impurities of the respired air have free access to their surfaces, they are continuously exposed to contact with injurious substances in solid, liquid and gaseous forms. Practically all of them become more or less infected during the years of infancy and childhood, and very often the noxious germs find a nidus in the crypts, where, of course, they are not visible. The very name crypt means hidden. The tonsils can be pronounced sound only after a deliberate and painstaking examination, involving the use of the microscope and tests for blood pressure. To be safe in our diagnoses we must start with the presumption that some abnormal condition is present. Very often we begin with the disease in a distant organ and work backward to the tonsils, where the infectious process started. In the diseases hereafter considered, the charge of causation is in each instance supported by the testimony of very competent witnesses, references being given to their full original reports, here quoted in the forms of abstracts.

NEPHRITIS.

Dr. H. W. Loeb.¹ Emphasis was laid upon two statements: 1. Acute nephritis is a frequent sequel of tonsillitis. 2. This fact is overlooked by the majority of physicians. Dr. Loeb gave as illustrations detailed histories of four cases, all occurring in the families of physicians and carefully observed throughout their course.

1. A girl of thirteen years had annually for several years very mild attacks of tonsillitis. The last of these was prolonged for two weeks, but subsided without causing apprehension. A fortnight later she suffered from intermittent attacks of severe headache and her urine was tinged red. Examination showed albumin, many erythrocytes, pus, hyaline and granular casts; specific gravity 1009. Energetic treatment was ordered, but in a few hours there occurred an uremic convulsion which was succeeded by others during three days, when uremic coma supervened and the prognosis became extremely grave. Under large doses of jalap, elaterium and

magnesium sulphat, together with the electric light pack, consciousness returned; but the girl was so asthenic that the most careful nursing was required for eleven weeks before an operation was considered advisable. The tonsils were then enucleated. After this the albumin disappeared and the kidneys gradually became normal; but six months elapsed before recovery was complete.

2. Mrs. S., aged twenty-eight years, wife of a physician, had several attacks of lacunar tonsillitis. During convalescence from the last, headaches appeared, speedily followed by severe hemorrhagic nephritis, which required four months of hospital treatment before it was overcome.

3. Dr. R., a hospital interne, had bilateral otitis media and at the same time a tonsillitis which he considered so slight as to require no treatment. Nephritis developed insidiously, and when the first urinary examination was made the analysis showed a large amount of albumin, together with blood and numerous casts. The disease yielded only after three months of energetic treatment.

4. This patient also was a hospital interne, and nephritis following inflammation of the tonsils eluded the attention of both the patient and his colleague until a urinary test was made, when the disease was found already well developed. The patient recovered under eliminative treatment.

These four cases were studied by several able clinicians in St. Louis, and they concurred in the opinion that the tonsillitis was not only precedent but causal, and that the infection had passed from the throat glands to the kidneys, where it showed much greater virulence than in the tonsils.

T. G. Orr² narrates with full details a most instructive case. A boy, aged three years, was admitted to a children's hospital after two months' illness, gradually growing worse. The diagnosis recorded was: "General anasarca with liquid in pleural and peritoneal cavities, and hypertrophied adenoid and tonsils." The urine had a heavy cloud of albumin and many hyaline and granular casts. Despite treatment the edema increased, and at the end of three weeks both chest and abdomen were tapped. For five months, treatment, evidently judicious and faithful, was continued. Under restriction of drinks, hot packs, diuretics, etc., the edema would temporarily diminish, only to recur with any cessation of the

eliminative measures. The serous cavities always contained some liquid and the urine was always albuminous. In hope of stopping the infective process the colon was flushed and all defective teeth extracted, but the child grew no better. As cultures from the nose and throat showed the staphylococcus, it was decided as a dernier resort to remove the tonsils and adenoid. This was done under ether, very little being given, on account of the patient's asthenic condition. Within forty-eight hours following the operation a remarkable improvement was shown in both symptoms and general signs. Ten days later the edema had disappeared, the appetite was good, strength was increasing, and the urinary albumin was greatly decreased. Soon afterward the boy was discharged as cured, his general condition being excellent, with clean throat, no edema and only a trace of albumin. Fortunately, an opportunity occurred about twelve weeks later to reexamine this patient. He then appeared in vigorous health, with a clean throat, no liquid in serous cavities, no edema, no albuminuria. The only vestige of his almost fatal nephritis was the presence of a very few hyaline casts.

But one rational explanation of this case is possible. The kidney disease was kept up by continual reinfection from the tonsils and adenoid, rendering futile the vigorous treatment pursued. As soon as this reinfection was stopped, the treatment became effective and restorative processes operated successfully. The surgical interference undoubtedly saved this child's life.

Allen Baines and George A. Campbell⁸ report that the urine was examined, prior to performing tonsillectomy, in all operations done in the Hospital for Sick Children, Toronto. In a large number of patients operated on during a period of twelve months, twenty-four had albuminuria, and nineteen of these had tube casts in addition. In twenty-two of these cases, both albumin and casts wholly disappeared in from one to six weeks after operation. In two cases the abnormal constituents continued present at the time of reporting, eight and twelve months respectively after tonsillectomy. In these two patients the renal disease had taken such firm hold that it persisted after the removal of the infecting agency which had caused it. The other twenty-two cases are obviously additional illustrations of the process of reinfection from the

tonsils, whose baneful influence nullified all efforts to cure the nephritis until tonsillectomy changed the whole aspect, when recovery occurred rapidly.

It is clear that hemorrhagic nephritis is often due to tonsillar disease, and equally clear that the renal inflammation is often unsuspected until it has made great headway, because its prodromes are masked by the throat affection. The pyrexia, malaise, headache and backache, commonly present in the first stage of Bright's disease, are indeed observed, but they are habitually and quite naturally attributed to the tonsillitis. It is quite sufficient to account for them, and many careful and skillful men have searched no further for their cause and have thus overlooked the insidious progress of the graver malady until a rapidly developed edema, or even a uremic convulsion, has furnished alarming proof that the kidneys were seriously involved.

Urinalysis would prevent the diagnostic error, and, if there were no alternative procedure, I would advise it in every case; but we must bear in mind that there are practical obstacles in its way. To request a sample of the patient's urine, to get that sample, to have it examined chemically and microscopically—all these things consume time and virtually involve expense. Moreover, they impress the patient with the fear of a disease universally dreaded, and although, in the majority of cases, the test will show that this alarm is groundless, yet in many persons the interval of anxiety does harm—and we all know that it is much easier to excite fears of this sort than to allay them.

Fortunately, there is a better diagnostic procedure, one quite free from objection. This depends upon the fact, now well known, that hemorrhagic nephritis produces an extraordinary rise in blood pressure, nearly always as much as forty millimeters, while the rise in uncomplicated tonsillitis is slight. In view of this fact, I most earnestly advise that the blood pressure be observed at the initial examination of every patient affected with tonsillar disease. This procedure takes little time, requires no fetching and carrying to a laboratory, no help from any one but the laryngologist himself, and involves no expense. The patient is not alarmed, though usually much interested. Should he inquisitively insist upon some explanation, a sufficient answer is that the ingenious instru-

ment applied to his arm amplifies the knowledge of his circulation partly supplied by the familiar clinical thermometer and count of his pulse.

If the sphygmomanometer shows a normal blood pressure, or a rise which does not exceed twenty millimeters, we may safely conclude that as yet no morbid changes have occurred in the kidneys. If the rise is between twenty and forty millimeters, prudence dictates a second observation within a day or two, when a fall in the scale may relieve us of further solicitude. If the rise is above forty millimeters there is danger, and an examination of the urine should be made as speedily as possible. It is believed that adherence to this plan of making a blood pressure test as part of the initial diagnostic examination, will disclose all those cases of intercurrent nephritis often unrecognized, and estimated by some as high as ten per cent of the aggregate of attacks of tonsillitis, and will save many lives; for while the kidney disease is sometimes slight and subsides spontaneously, it not infrequently presents a fulminating and lethal severity.

As an illustration of the great significance and value of the blood pressure test, I give the following incident, which occurred very recently: A physician with a large family practice remarked casually that he was having a "run" of patients with tonsillitis, three of them being in one household. He was advised to take the blood pressure in as many cases as possible and follow this up with urinalysis. As this doctor was examiner for a life insurance company, he had at hand all the apparatus required, and he laughingly promised to follow the advice, "to oblige a friend," though he thought it was making too much of a trivial matter; for he shared in the common error that tonsillitis is a trifling affair. Three days afterward he reported that he had taken blood pressure in nine cases, in none of which any complication had been suspected. In four of these he found (to his astonishment) an increase of over forty millimeters. Two days later the matter had grown serious. In five patients, whose blood pressure was nearly normal, urinalysis gave no indication of disease; but in the other four, where it had mounted so high, the urine contained much albumin, many tube casts and a large number of red corpuscles. These four young people, who had been walking about, esteeming themselves nearly "cured of the

sore throat," were at once put upon energetic treatment for acute Bright's disease, and none too soon.

One other point deserves attention. May not high blood pressure in the course of tonsillitis or closely following it be due to something else than nephritis? This is possible, but not at all probable. Aside from nephritis there is but one common disease habitually associated with very high pressure: that is arteriosclerosis, and it belongs to the latter part of life, while tonsillitis is nearly always a disease of youth. The high figures upon the scale will almost uniformly point to nephritis, and if exceptionally we find that instead of this they signify sclerosis, the test has still been useful, for our diagnosis has been made more complete and the patient has in no way been injured.

RHEUMATISM.

The frequent association of tonsillitis with the initial stage of acute articular rheumatism has made current the phrase, "rheumatic sore throat." It was formerly believed that the poison causing rheumatism was inorganic in nature and first appeared in the blood, subsequently acting on different organs, interfering with their functions and later causing structural changes. The tonsils were observed to be affected early in the course of the disease, even before the joints, but both local lesions were regarded as secondary to a vitiated crasis of the blood. Bacteriologic studies have led to an inversion of this sequence and to the theory that pathogenic germs, chiefly the cocci, find lodgment in the tonsils, causing inflammation, and thence migrate to the articulations, producing the familiar phenomena of acute rheumatism. Autopsies upon those who have died of the disease, not infrequently show the tonsillar crypts to be inhabited by colonies of microbes, rendering it probable that these cavities have been foci of infection. It has been said, on the other hand, that very few clinicians have found such colonies during the patient's life. It is likely that very few have looked for them. Most of the authors say nothing on the subject, and their silence is significant.

Singer⁴ gives facts gathered from sixty cases of acute articular rheumatism taken without any plan of selection, just as they came consecutively in clinical work. Microbes

were found in the blood in fifteen per cent of these patients, and in the urine in fifty-five per cent. The staphylococcus and streptococcus were the most numerous.

ARTHRITIS OF VARIOUS ORIGINS.

Frank Billings, as the result of the study of seventy cases treated in the Presbyterian Hospital, Chicago, declares that the center of infection was most frequently a chronic streptococcus focus in the faucial tonsil. In advice as to treatment he gives first place to tonsillectomy.

David J. Davis.⁶ This witness sums up his results as follows: "Extirpation of the diseased tonsil, or focus, leads commonly to marked improvement, or to complete relief. This points to the tonsil as a focus from which infectious material is being constantly disseminated. In the diseased tonsils a hemolytic streptococcus is found in nearly all cases."

SIMPLE AND EXOPHTHALMIC GOITER.

Charles H. Mayo,⁷ in reviewing five thousand operations for these diseases, propounds the theory that the beginnings of thyroid hypertrophy may be a defensive effort of the organism to resist toxic invasions, and remarks: "Repeated tonsillitis is another disease in which an infection may have a bearing on the hyperactivity of the thyroid." The importance of this suggestion is increased by the fact that Dr. Mayo is habitually cautious in statement relating to etiology.

TUBERCULOSIS.

T. H. Halsted⁸ declares that a tabulation had been made of the reports furnished by twenty-eight investigators. The total number of tonsils was nineteen hundred and eighty-six, and all were by the naked eye adjudged healthy, or merely hypertrophied. Upon critical examination it was proved that one hundred and nineteen, or 5.9 per cent, were tubercular. The percentage is doubtless much higher among tonsils obviously diseased. The tonsillar crypts frequently contain colonies of tubercle bacilli, which may remain dormant or may migrate to the cervical lymphatic glands and hence to the apices of the lungs.

DEAFNESS.

D. J. Gibb Wishart.⁹ In the Victoria Hospital for Sick Children, Toronto, there were during the period considered one hundred and three operations for the removal of the tonsils. Few of the patients were brought in on account of sore throat, many because difficulty in breathing had alarmed the parents, and a very large proportion on account of otitis media and partial deafness. Dr. Wishart considers it a waste of time to work with astringent sprays and internal tonics. Tonsillectomy is his routine and very successful treatment. The only exception is in cases approaching puberty, where a spontaneous change in the glands may be anticipated at an early date. Even this exception is a partial one, and the author makes this significant remark: "In these patients approaching puberty, very careful judgment must be used, and it is better to operate than to run the risk of ear complications which may permanently disable the patient. For a comparatively slight enlargement may, by its tendency to promote catarrhal trouble, sow the seeds of chronic ear catarrh and promote early deafness."

Injury to the delicate auditory mechanism with its deplorable results is one of the dangers which one should fully appreciate when tempted, for any reason, to leave undisturbed a diseased mass of tonsillar tissue. Danger of extension to the middle ear is doubled by the fact that the disease has not only the usual channels through the veins and lymphatics by which to reach the ear, but has another road along which it can travel very rapidly. It can move by contiguity along the walls of the pharynx and up through the eustachian tube to the middle ear, every stage of the advance being through the superficial tissues, whose structures and surface are of identical character all the way.

NERVOUS DISORDERS.

M. Berest of Paris¹⁰ attributes to the tonsils various neuroses, such as esophageal spasm, recurrent cough, spasm of the glottis, neuralgia of the tongue and blepharospasm. He found these to be cured or much ameliorated by tonsillectomy, after he had made a long and discouraging trial of other forms of treatment.

Dyspnea, dysphonia and dysphagia are the common habitual

results of the obstructive effects following tonsillar hypertrophies. In regard to them it appears unnecessary to present testimony, not because it is wanting, but because it is superabundant. The harm resulting from obstruction is well understood and fully appreciated by every specialist dealing with the throat. Some indifference exists among our colleagues who are engaged in general practice, an indifference due to inadequate acquaintance with the subject, which may with them have attracted little attention. Interest in the matter should be awakened and information disseminated by every proper method. Efforts of this sort will speedily banish the indifference; for obstruction produces results both immediate and remote whose evils are clearly demonstrable, and when these are once apprehended they will be regarded in their true character by the earnest and capable family physician, who will cooperate with the laryngologist in preventing the development of many morbid conditions whose prevalence is due partly to neglect and partly to former ignorance of the etiologic part played by the tonsils.

The charges in this indictment might be multiplied, much more evidence might be brought forward, but what has been presented is sufficient to convince an unprejudiced mind that, by the consensus of professional opinion, the tonsils are held for the causation of many diseases.

As to the plea occasionally made that they may sometimes act as barriers to infection, the present state of opinion among those best qualified to judge seems to be that one expressed by Dr. Murtagh O'Doyle. He had been advocating tonsillectomy before a medical society, laying emphasis upon the dangers of infection, when one of his auditors asked the question: "You have given us several instances where the tonsils have been forwarders of pathogenic germs; but may they not, under other conditions, act as barriers? In your wide experience, have you not seen tonsils prevent infection?" O'Doyle seemed to ponder deeply for some moments, then replied: "Yes, I have seen a number of such tonsils; thirty-one, to be accurate. They are preserved in glass jars at my office. I have no doubt that they have prevented many dangerous infections, by their absence, since I cut them out."

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LIV.

REMOVAL OF FOREIGN BODIES FROM THE UPPER LOBE BRONCHUS.*

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The bronchoscopic removal of foreign bodies from the bronchi, bloodlessly through the mouth, is so successful (over ninety-six per cent of successes) that the causes of failure deserve careful study. The author has previously considered the failures due to inability to find a small foreign body far down and far out, near the periphery of the lung in a bronchus too small to be entered with a bronchoscope. Next to these minute bronchi in importance, from the viewpoint of bronchoscopic difficulties, is the upper lobe bronchus, because of the angle at which it is given off from the main bronchus, and because of the ascending direction of many of its branches, which precludes their entry by a bronchoscope. Fortunately, the upper lobe bronchus is rarely invaded by foreign bodies. In the author's clinic there were only four invasions of the upper lobe bronchus in four hundred and eighty-two cases. This refers only to cases in which the foreign body completely entered the upper lobe bronchus, and does not include the relatively common lodgment of a foreign body at the orifice of the upper lobe, resulting from the narrowing of the subjacent stem bronchus.

It was formerly thought that a more favorable angle for entering the upper lobe bronchus could be obtained by tracheotomic than by oral bronchoscopy. The author has demonstrated the fallacy of this.†

The difficulties of removal of foreign bodies that have dis-

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†Report to the International Medical Congress, London, 1913, Section XV.

appeared within the upper lobe bronchus may be summarized in the expression of their location relative to the bronchoscopic tube mouth as "around the corner." In the first three upper lobe bronchus cases the author succeeded in exposing the foreign body by displacing the spur or "corner" by lateral pressure with the lip of the bronchoscopic tube mouth, the head and neck of the patient being pressed far over and down toward the opposite shoulder, the axis of bronchoscopic movement being the upper thoracic aperture, not the larynx. This did not present a lumen image, but it exposed the intruder to view and rendered forceps removal feasible with the regular side curved foreign body forceps. In order to reach "around the corner" the author has had a new type of forceps made. As the jaws cannot be seen to close, as is the rule in bronchoscopic foreign body extraction, their closure should be watched in the double plane fluoroscope devised for the author by Dr. George W. Grier. Brief mention of the author's five cases of foreign body in the upper lobe bronchus follows:

Case 1.—Girl of twelve years. Glass headed pin in left upper lobe bronchus. Point caused to project into left main bronchus by displacement of the spur with the lip of the tube mouth. Removed with side curved forceps (not upper lobe bronchus forceps).

Case 2.—Girl of eighteen years. Bone in right upper lobe bronchus. Found with tube and removed with side curved forceps (not upper lobe bronchus forceps).

Case 3.—Girl of six years. Peanut kernel in left upper lobe bronchus. Found with tube and removed with straight forceps.

Case 4.—Man of sixty-five years. Metallic body in left upper lobe bronchus. Located by the team work of the expert roentgenologist (A. F. Holding) working with the fluoroscope while the author worked with the bronchoscope. The foreign body could not be seen or reached by the bronchoscope, or felt with any instrument. As removal was previously tried by three other experienced bronchoscopists (Henry Janeway, Harmon Smith, Sidney Yankauer), this may justly be considered a failure of bronchoscopy. Even localization by the bronchoscope would not have been possible, had it not been for the skillful fluoroscopic cooperation of

Dr. Holding. When the author placed the tube mouth in the orifice of the upper lobe bronchus, Dr. Holding stated that the foreign body was located upward and outward from the tube mouth, which was also visible to Dr. Holding in the screen. This fixed the localization in an ascending branch of the upper lobe bronchus, and the bearings obtained by a lateral fluoroscopic observation by Dr. Holding demonstrated that it was an anteriorly ascending branch.

Case 5.—The last case, though not strictly an upper lobe bronchus case, deserves inclusion here because it presented the same mechanic problem because of the situation of foreign body with reference to the main bronchus. The case is also exceedingly interesting from other points of view. First, and most important, it is the only recorded case in which a diagnosis of probable foreign body was made without a history of foreign body and without a radiograph. The diagnosis was made by Dr. George L. Richards, who sent the patient to a radiographer to verify the tentative diagnosis, the basis for which will be given by Dr. Richards, who is present at this meeting.

The bronchoscope revealed a stricture of the right main bronchus about two millimeters in diameter. This was readily dilated with the author's bronchoscopic dilators, revealing a large cavity below, filled with thick viscid pus. After this was removed inspection of the interior of the cavity showed it to be formed of the main bronchial wall. The foreign body was not visible. Acting on the localization of the excellent radiographs of Dr. M. N. Tennis, the upper lobe bronchus forceps were passed and, reaching "around the corner," the foreign body was felt, grasped and drawn into the visual axis of the bronchoscope beyond the tube mouth, whence its removal with plain forceps was easy. It was found to represent the much corroded head of the tack. The elevation representing the shaft showed only black corrosion, with no sign of a fractured steel or iron surface. Sponging out the cavity brought away black specks, one of which resembled a point. The upper lobe bronchus forceps were then inserted for localization and a radiograph was taken. The forceps and bronchoscope were then removed and another radiograph was taken, to see if anything remained of the stem. Notwithstanding a most excellent negative, no trace of anything was

visible. The patient left for his home in Massachusetts the same evening. As to whether the stricture will close again to such a degree as to require dilatation, only the future can decide.*

Of the author's other six cases of prolonged sojourn of a foreign body, none has required after-dilatation.

*Eight months later the patient was in perfect health, having had no recurrence of symptoms.

LV.

EYE ADENOIDS AND THEIR RELATION TO THROAT
ADENOIDS. THE AUTHOR'S MODIFICATION
OF THE ADENOTONSILLECTOMY OPER-
ATION.*

BY T. E. OERTEL, M. D.,

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It would almost seem as though one who approaches the subject of operation upon the lymphatic structures of the nasopharynx and throat should prefix his remarks with an apology for daring to treat a subject upon which so much has been already said. It is, however, the hope of the author that the following presentation of this important subject may not be entirely worthless. It will be his endeavor by the correlation of known facts and the presentation of certain steps in technic developed in his practice to establish his deductions as to the following dicta, and also to show that there is good ground for believing in the direct relation of the follicular conjunctivitis of children with lymphoid hypertrophies in the nasopharynx, as was first pointed out by Oertel¹ in 1912.

ANATOMY OF THE CONJUNCTIVA.

"The conjunctiva, a most important mucous membrane, joins, as its name implies, as well as covers, most of the parts in the front of the eye. It is a loose, lymphoid structure, continuous with the epidermis at the margin of the lid, and lining the inner surface of the lid, in which location it is known as the palpebral conjunctiva. Upon leaving the lids it forms the superior and inferior palpebral folds and is then reflected onto the eyeball, where it bears the name of ocular conjunctiva. This place of reflection is known as the fornix conjunctivæ or sulcus, of which there are two, namely, a superior and an inferior."²

*Candidate's thesis presented to the American Laryngological, Rhinological and Otological Society, 1915.

"The lids are rich in lymphatics, which are connected with the vessels covering the face, with the parotid system, and perhaps with the submaxillary glands. Some infections of the conjunctiva are, for this reason, accompanied by soreness and swelling of the preauricular gland."⁴

"The lymphatics of the conjunctiva and of the lids are divided into those of the integument of the lid and those of the conjunctiva; both sets are united and, by means of superficial and deep lymph vessels, separated by the orbicularis oculi, conduct partly into the lymph nodes of the parotid region and partly to those of the submaxillary region."⁵

"The normal conjunctiva contains many small lymph nodes, the so-called solitary follicles. These are especially numerous in the region of the fornix, both above and below."⁶

ANATOMY OF THE THROAT.

The lymphatic tissues of the nasopharynx consist of numerous follicles of varying size which are composed of a delicate reticulum of connective tissue in which lie lymph cells or leucocytes.

Such aggregations are more or less definitely bounded by a connective tissue capsule and pierced with prolongations from the same. Besides these well organized bodies there are numerous collections of lymph cells which are diffuse in character and merge without definite boundary into the surrounding tissues.

The more highly organized nodes are arranged in a circle known as Waldeyer's ring. This includes above, the pharyngeal or Luschka's tonsil; below, at the base of the tongue, the lingual tonsil; lying between the pillars of the fauces and on either side, the faucial tonsils.² The more diffuse aggregations are very numerous throughout the whole of the mucous membrane of the nasopharynx and fauces. All of these structures communicate through a rich plexus of vessels with the deeper lymphoid structures of the neighboring tissues.

Relative to the function of these structures there has been endless speculation, but at present nothing definite is satisfactorily determined. Suffice it to point out that chronically enlarged tonsils or adenoids seem to predispose to those maladies which we believe find their portal of entrance through the mucous membrane of the upper respiratory passages. For

this reason the lymphatic structures of the throat have by some been supposed to act as guards against invasion by microorganisms.

ADENOIDS OF THE CONJUNCTIVA, FOLLICULAR CONJUNCTIVITIS.

Follicular conjunctivitis is manifested by a hyperplasia of the small aggregations of lymphoid cells, solitary follicles, and is most marked in the fornix, both above and below. The hyperplasia is doubtless both simple, in the early and less pronounced forms, and numerical in those cases which become subacute or chronic, or in which the existing cause is present in greater degree. In many of the acute conditions of infection of the conjunctiva we naturally find swelling of these lymph nodes, but the term follicular conjunctivitis should, it seems, be rather limited to a condition of low grade irritation which continues over a considerable period of time, often years, and which presents no definite known bacterial flora as a basis. Authors of textbooks upon this subject are pleased to be indefinite.

As an example, Fox⁷ says: "It is the conjunctivitis which appears periodically in large schools, asylums or prisons, and it is infectious." And again: "The symptoms are the same as in ordinary catarrhal conjunctivitis. The distinguishing feature is the presence of the hypertrophied lymph follicles."

Fuchs⁸ says: "Follicular catarrh is characterized by the presence of follicles." Further: "The etiology of follicular catarrh has not up to this time been established. By some, contagion, by some, miasm has been assigned as a cause of the disease without any certain proof being brought for either one view or the other."

"The malady is found with especial frequency in schools, etc., in which many of the scholars are attacked by it at the same time. In many of these people the disease exists in an entirely latent way, as, in spite of there being a considerable number of follicles, the conjunctiva is not reddened and causes no sort of discomfort, so that the affection is first discovered by the physician's examination."

To this latter statement I wish to draw particular attention.

De Schweinitz⁹ recognizes that "the descriptive term conjunctivitis, as applied to this affection, is usually not accurate, because, in fact, the signs of inflammation are generally

absent." "The disease arises under the influence of bad hygienic surroundings, especially in pauper schools, where it may appear as an aggravated epidemic; but it is frequently seen in mild form, especially among children during their school years, particularly if they are subjects of anemia and chlorosis."

May¹⁰ describes the condition in the following terms: "This disease, also known as follicular catarrh, is characterized by the occurrence of 'follicles,' with or without the symptoms of catarrhal conjunctivitis."

OBJECTIVE SYMPTOMS.

"The conjunctiva of the lower retrotarsal fold (less commonly also the upper fornix) presents a variable number of small, round, pinkish translucent bodies, each about the size of a pinhead; when abundant they are arranged in rows. These follicles consist of circumscribed aggregations of lymphocytes (adenoid tissue) identical in structure with the granulations of trachoma. On this account follicular catarrh is sometimes looked upon as an early stage of trachoma. But this is regarded as unlikely by most authorities, since there is neither papillary hypertrophy, cicatricial changes nor other sequela, no evidence of contagiousness, and the affection subsides without leaving any traces."

Ball¹¹ more rationally says: "The conclusion seems evident that folliculosis is to be regarded as an expression of adenoid activity incident to childhood and youth."

One cannot, however, entirely agree with the opinion that follicular conjunctivitis is due to normal adenoid activity, else all children would show the condition and not alone those who have been subjected to "unhygienic surroundings" and the like, as set forth by most writers.

"Adenitis, that is, inflammatory enlargement of the lymph nodes, whether due to soluble toxins or to direct infection, varies according to the nature of the irritant."¹²

We have the reaction of a given tissue to an irritant, and, dependent upon the degree of irritation and the time of its duration, we may have all forms of tissue changes from simple swelling to necrosis, softening and liquefaction.

That the pathology of the lymph nodes of the eye should essentially differ from that of lymph nodes elsewhere is not

a logical conclusion. The changes with which we have to deal are cellular, and therefore the size of the structure has no bearing upon the fundamental changes that may take place within it. The basic principles that govern changes in the lymphatic tissues must apply alike to the delicate aggregations of cells which in the conjunctiva make up the follicles and to the larger bodies of similar structure that constitute the so-called adenoids of the nasopharynx.

"The stimuli which are able to excite growth and cell division are known only in part."¹³

The causes which excite growth in the lymph nodes of the conjunctiva in that type of malady under consideration are no less obscure than those which lead to proliferation and hyperplasia of the lymph nodes of the pharynx. While they may properly be said to be "incident to youth," they are no more so than are the causes of many other diseases of children. It would seem rational to conclude that follicular conjunctivitis is always inflammatory. The statements of authors, some of which have been quoted, that the signs of inflammation are generally absent, may, after all, be not based upon fact.

The classic definition that inflammation is a condition of a tissue characterized by increased temperature, hyperemia, pain and swelling does not apply to the more chronic types. The best illustration of that form of inflammatory reaction in which some of these conditions are absent is the tubercle of tuberculosis or syphilis, which in its early stages presents only the phenomena of hyperemia and swelling. Stengel¹⁴ gives as the essentials of inflammation, hyperemia, excessive emigration of leucocytes from the blood vessels, and exudation, but modifies his definition by declaring that conditions vary according to the factors involved.

Many of my cases have presented a pale appearance, and, indeed, not infrequently these cases are of the most severe type. The pallor is due, not to an absence of inflammation, as one might be led to suppose, but rather to a condition of general anemia which is noticeable in all of the mucous membranes of the patient. That lymphoid hypertrophies are common in the poorly nourished child is a fact too well established to need more than passing mention.

Quite the most exact description of the pathology of fol-

lacular conjunctivitis which has come to my notice is that of Collins and Mayou,¹⁵ which is quoted entire:

"In primary chronic inflammation of the conjunctiva and acute processes which are subsiding, lymphoid cells make their appearance. These at first are evenly spread beneath the epithelium, but if the inflammation continue and become very chronic, these cells increase in number and form aggregations which are known as follicles. They resemble in structure and function those found in the lymphatic glands in which the cells are similarly produced. The formation of these follicles is mainly limited to the fornices, where there is already an existing lymphoid layer; but they may occur elsewhere—on the tarsus and at the limbus, as in trachoma. Before the classification of the inflammatory diseases of the conjunctiva, according to the nature of the infection, this follicular formation was known as follicular conjunctivitis."

From the above it would seem evident that my contention that follicular conjunctivitis is always inflammatory is established. Surely, such an assumption places us on a more rational plane of thought, and may also point the way to a correct solution of the etiology, not only of hyperplasia of the lymphatic tissues of the conjunctiva, but of the nasopharynx as well. For when we turn to the consideration of hyperplasia of the lymphatics of the nasopharynx, we are again confronted by a mass of contradictory evidence as to the cause of such hyperplasia, inaccurate description as to its location and extent, and unsurgical methods for its treatment.

Of the diverse causes set down as productive of "adenoids" the following may be mentioned: colds, heredity, mouth breathing, hypertrophy of the hard palate, deviation of the nasal septum, a catarrhal condition of the nasal passages, the strumous diathesis, tubercular diathesis, exophthalmic goiter, rickets, syphilis, climate, irritating vapors, uric acid diathesis, diseases of the liver and kidney resulting in cyanosis, intestinal irregularities, worms.

It is not proper, even from the operative standpoint, to presume, as some have done,¹⁶ that adenoids will group themselves alone into one distinct mass in the vault of the pharynx.

The student of textbooks would infer that the term adenoids refers alone to a mass of lymphoid tissue situated at

the vault of the pharynx, and commonly spoken of as the pharyngeal tonsil. Here and there one finds mention of adenoids in the fossæ of Rosenmüller. No mention is made of those frequent conditions of innumerable lymphoid hypertrophies, not only in the vault, but over the whole surface of the oropharynx. They are often especially noticeable along the lateral folds of the pharyngeal mucous membrane, while in many instances the posterior surface of the posterior faucial pillar will be found thickly studded with them. Needless to say, the usual operative procedures do not suffice for such conditions.

It is not the purpose of this paper to discuss the etiology of either the adenoids of the eye, in follicular conjunctivitis, or those of the pharynx.

Doubtless many of the so-called causes are indeed important factors in the production of these conditions, and the theory of Oertel,¹ of a common infection of the lymphatic tissues of the eye and throat conveyed through the lymph vessels, may not be incorrect. It would, however, seem to be reasonably certain that, whatever the etiology, there does exist a uniform relation between eye adenoids and pharyngeal adenoids.

There is no dearth of authority for the assertion that the follicles of trachoma are histologically identical with those of the milder follicular conjunctivitis. Collins has noted the occurrence of trachoma "in children with a general tendency to adenoid formation."¹⁷

One may question whether even this noted and competent observer may not have been led to this conclusion through having seen cases of the less harmful malady. Certain it is that the common statement that all cases of follicular conjunctivitis recover and leave a normal mucous membrane is far from correct.

The writer might cite several cases from his own practice in proof of this assertion, and it is his good fortune to live in a section where trachoma is almost unknown. He must insist that it is only logical to conclude that even a mild form of irritation extending over a sufficient length of time must cause structural changes in so delicate a tissue as the conjunctiva.

To establish his claim of constant association of eye adenoids and pharyngeal adenoids the author, not depending alone

upon his observations made in private practice and in the clinic of a hospital, has recently examined the children of a large school. Most of these children are from a factory district, and come from poor stock, live in more or less unhygienic surroundings and are poorly nourished. Probably for these reasons the percentage of cases found to be suffering with follicular conjunctivitis is high. So far as the school surroundings are concerned, they are ideal. The building is new, large and well ventilated, and the children receive competent supervision. No case of acute conjunctival infection of any nature is included. Several were observed. Most of the cases were severe so far as the eye manifestations were concerned. In none of them was there any question of diagnosis as between follicular conjunctivitis and trachoma.

Number of pupils examined.....	818
Number with follicular conjunctivitis.....	127
Number with follicular conjunctivitis having distinct enlargement of pharyngeal lymphatics to a pathologic degree.....	127

The number of cases is not large, but, in view of the uniform occurrence of adenitis of both the conjunctiva and the pharynx, must be deemed significant. In all but two of this series of cases there was also marked hypertrophy of the faucial tonsils. One case had undergone tonsillectomy and adenectomy a year previous. The results of the operation, so far as the tonsils were concerned, were excellent. In spite of this the pharynx is now filled with adenoids, and there is a severe grade of follicular conjunctivitis which will necessitate operation. A further study of school children is contemplated.

The various forms of curette employed for the removal of pharyngeal adenoids are murderous instruments indeed in unskillful or careless hands. Too often the operator is bent chiefly in displaying his adroitness rather than in doing the least possible harm to structures of the utmost importance, and uses the curette with an abandon and force which makes the observer shudder. The evils of scar tissue in the pharynx are too well known to need comment. What then must be the fate of the patient who has by the reckless use of the curette had his mucous membrane mangled and stripped from

the pharyngeal wall? Such cases are all too common, and instead of mucous membrane with its normal secretion of fluids, one sees only a dry, glairy, red surface, not infrequently covered with scabs, a source of constant and life-long discomfort, and a menace to the sense of hearing and one may even say to life itself.

Syzmanski¹⁸ mentions an ingenious method by which he sought to determine the amount of force exerted by various operators with the curette in the removal of adenoids. His experiments showed a range of from one to ten pounds. His own pressure was from six to eight pounds.

It is difficult to comprehend why there should be such a universal use of the curette except as a means for cleaning up after the chief part of the pharyngeal tonsil has been removed.

When we come to consider the removal of the faucial tonsils, we must also read with wonder. The vast amount of literature on this subject emphasizes its importance, and the variety of opinions as to the best methods of procedure point all too plainly to the fact that our opinions and operative technic are not yet perfect. It is even asserted by some that removal of a part of the tonsil only is a surgical procedure for simple hypertrophy,¹⁹ and the tonsil punch is still figured in our textbooks, wending its way from one to another, though it has long since been discarded by most operators as an instrument that is obsolete.

The writer can conceive of no condition which warrants removal of a portion of the tonsil. When this is done the stump will often enlarge to perhaps the original size and come to operation a second time, or there will result a cicatricial mass with buried crypts which will give more trouble than ever. Neither can I agree with Borchers²⁰ and others, who advise finger dissection of the tonsil. The amount of force necessary for such a procedure must often be considerable, and Borchers admits that in many cases it will be necessary to resort to instrumental delivery. Many operators who use finger dissection finish the operation with either the snare or tonsillotome, and it would seem that dissection with the knife must be far more surgical in any case than the use of so blunt an instrument as the finger.

By many the removal of the tonsil is regarded entirely too

lightly. Tydings²¹ says: "There is not a more difficult procedure in surgery than tonsillectomy under general anesthesia." And the careful observer must agree with him, for many of the cases most in need of our assistance will tax our skill to the utmost, that operation being the most excellent which results in the removal of the offending organ with the least damage to the normal structures which surround it. As Hurd²² points out, it is the small submerged tonsil that as a rule gives the most trouble, and to enucleate such an one without damage to the pillars and underlying structures is not always easy. We have all seen, and perhaps unfortunately in our own cases, such untoward results as are pointed out by Stucky,²³ who mentions numerous cases of deformities arising from faulty removal of the tonsils, and who considers the operation a major one, to be done in a hospital with careful surgical technic. In discussing tonsillectomy, Iversen²⁴ says: "Of the different methods of tonsillar extirpation, I would mention in particular the snare. It is claimed to be selective: that is to say, it squeezes its way through the connective tissues to better advantage. That this is not true can readily be seen from the removed tissues, and oftentimes the muscles of the pillars are mutilated, or deep-seated stumps remain which may bleed severely." One need only remark that the fault in such cases does not lie with the snare.

During the past summer a noted laryngologist in Europe exhibited to the writer with pride a tonsil he had just extracted with the tonsillotome, as a specimen of neat and thorough enucleation. To the question relative to tissue adhering to the tonsil, "What is this, doctor?" he replied, "Oh, that is only the anterior pillar; that makes no difference."

Quite other than this is the opinion of Hurd, in the article already quoted, who says: "Tonsillectomy ideally done should not injure the singing or speaking voice. On the other hand, injuries to the pillars, velum or uvula during a tonsillectomy may ruin the singing voice and impair speaking."

Franklin²⁵ recommends suturing the pillars in cases of bleeding, and claims that the resulting scar after such procedure is no greater than that which follows healing in the ordinary case. Quite the contrary is the case, as in many instances of pillar suturing the pillars may be entirely oblit-

erated and an ugly mass of scar tissue remain on either side of the throat.

One must allow that there will arise cases in which pillar suturing to stop hemorrhage is an absolute necessity, but it should by no means be employed as a routine; rather only as a resort when simpler measures have failed. Even then the sutures should be cut at the end of twenty-four hours or sooner, as advocated by Hayden.²⁶ Care in operating is the best hemostat and produces the minimum of scar. While it is true, as Makuen²⁷ remarks, the tonsil that requires removal is always prejudicial to voice excellence, it is also true that in the removal of such tonsils we may by faulty methods do more harm to the voice than the offending tonsil would have done.

Cohen²⁸ goes to some length in his description of the method of ligation of bleeding points after tonsil extirpation. His method is entirely practical, and is doubtless in use by many surgeons. Certainly, ligation of a bleeding vessel in the throat is in line with rational surgery elsewhere. It is, however, by no means easy of accomplishment in many cases where it may be desirable, and the method of ligation with silver wire, to be later described, answers quite as well as the string ligation and is much more rapid and simple. The writer believes, with Cullom,²⁹ that no case of tonsillectomy should be allowed to leave the table until all hemorrhage is checked and the wounds entirely dry.

TONSILLOADENOIDECTOMY AS DONE BY THE AUTHOR.

In this operation the tonsils are usually first removed. My modifications of the snare operation need only be considered, as the usual methods of procedure are well known. The patient is thoroughly anesthetized, the choice of anesthetics being left to the discretion of the anesthetist. Chloroform is preferred, as ether stimulates the mucous glands and renders the operation more difficult by reason of the sloppy throat. The patient lies upon his back, with a small pillow between the shoulders, allowing the head to fall backward, to obviate the dangers of fluids being inspired into the lower air passages.

The light used is a Nernst lamp upon a tilting stand. A mouth gag without a tongue depressor is used. The Green and other mouth gags with stationary depressor fail to give

proper working room. They hold down the tongue, it is true, but the base folds up alongside of the tonsils so that a good view cannot be obtained.

The author uses his tongue depressor (Figure 1), which is so constructed that it pulls the base of the tongue forward and away from the tonsil and at the same time puts on a stretch the plica and pillars. The operator stands on the right side of the patient, tilts his head to the right, so that the field of operation is thoroughly illuminated and, having pulled the tongue to one side with the depressor described first, frees the right tonsil with Kyle's tonsil knife. This step is one that should be most carefully carried out, for upon its proper performance depends the success or failure of the operation. It should be our endeavor to save every possible bit of mucous membrane covering the tonsil. The knife is introduced at the posterior border of the supratonsillar fossa, and should go no deeper than the thickness of the mucous membrane. Section should follow downward along the edge of the plica, care being taken not to nick this structure. The cutting edge is now reversed, and a similar section of the mucous membrane only should follow the anterior edge of the posterior pillar. The tonsil is now ready to be engaged in the forceps. One with a narrow point should be used. Personally, I have obtained the best results with Lovell's tonsil forceps.

If the tonsil is properly freed, as above described, it will be completely everted by traction upon the forceps. No. 8 piano wire is used, the large size being better than a smaller, for the reason that it is stiffer, will better follow the tonsillar capsule and results in less hemorrhage. The loop is passed over the forceps and carefully guided around the margin of the everted tonsil. The author prefers the Kratzmüller snare. The loop is slowly tightened and steady pressure made until it cuts its way through the tissues. As soon as the tonsil is delivered a "bird's nest" gauze sponge is grasped with the author's dressing forceps (Figure 2), placed between the pillars in the bed of the tonsil and held there with firm pressure for a few moments. This is usually sufficient to control the hemorrhage. The sponge is left in place and the left tonsil removed in like manner.

The dressing forceps, above referred to, is of great advantage on account of its rigidity, and the shears handles allow

of a certain, comfortable grip. An assistant to do the sponging is not always available and is, in fact, rather a hindrance than otherwise. I prefer to do my own sponging. The nurse keeps a supply of "bird's nest" or folded sponges on the sheet covering the patient's chest, and these may be rapidly picked up with the dressing forceps, as required. Dry sponges are used.

Care in sponging should be employed, as it is easy to denude the mucous surfaces of their covering by rough sponging and add to the discomfort of the patient during the period of recovery. If the steps of the operation have been properly carried out, we should now have a clean, dry wound, symmetrical upon either side, with the pillars and plica intact. The sponges are removed and if there is still tendency to bleed, the vessel is caught with a long hemostat and ligated by clasping about it a silver wire clip. The instrument used for this purpose (Figure 3) was, I think, devised by Dr. Harry Cushing for use in brain surgery. I have employed it for some years in all cases of tonsillectomy in which bleeding was not promptly checked by sponge pressure, nor have I been obliged to resort to any other method in a series of some hundreds of cases. The little piece of wire gives no trouble and is never heard of again. I have been asked if I was not afraid of having these clips find their way into the lower air passages. Of this I think there is no danger, as they are so light that they would not fall downward by gravity, but would rather adhere to the mucous membrane, even if they were free. It must also be remembered that when they slough off they are embedded in the mucus and exudate of the wound, and so are spat out by the patient. Their ease of application and efficiency recommend them, and after their use one may retire without the fear of being called to check a postoperative hemorrhage.

I have not for many years had either any considerable trouble in checking bleeding or a single case of postoperative hemorrhage. Care in removal of the tonsil, and surgical control by ligation with the silver wire clip, are, I think, responsible for my freedom from anxiety in this respect. Retraction of the anterior pillar and thorough inspection of the tonsil bed should be the last procedure before the patient leaves the table. Even the slightest bleeding should be entirely controlled by this time.

ADENOIDECTOMY.

The extirpation of the tonsil may be reasonably well done by many operators. I fear this is not the case when one comes to consider the usual methods for the removal of adenoids. The manner of use and dangers of the curette have been already mentioned.

That operation in the nasopharynx which removes most thoroughly the offending structures and which, at the same time, does the least harm to normal tissues is surely the best method. It is much easier for the surgeon to use a curette, trusting to his sense of touch, than it is to employ a method that will be more troublesome and time consuming. But our aim should be the most perfect end result, and not mere convenience. I venture the assertion that careful investigation will reveal a large majority of cases which come to operation that have not only a hypertrophy of the lymphatic tissues in the vault of the pharynx, but such a general lymphatic enlargement as has been previously mentioned. It has seemed to me that promiscuous and rough scraping with a curette in a situation where so much damage may be done is not worthy of our best surgical skill.

My method of procedure follows: The head is somewhat lowered, in order that blood may be kept from the throat. A suitable sized La Force adenotome is then introduced, and such tissue as it embraces is cut away. This instrument makes a clean, smooth cut, and the severed portion is secured in the box above the sliding blade. A sponge is grasped with the dressing forceps and held firmly in the oropharynx, thus blocking the blood from the throat. Blood that is swallowed tends to produce nausea. Bleeding through the nose will be free for a few moments and may be wiped away by an assistant. When the bleeding has been sufficiently controlled, the soft palate is retracted with my retractor. (Figure 4.) I have had this instrument constructed of thin metal, and find it answers its purpose admirably. The tongue is held with the tongue depressor by an assistant, and this gives a clear view of the pharynx almost to its vault. A small curette is now employed, under direct observation, to clean up the edges of the wound already made, or my roller forceps (Figure 5) is brought into play.

With this it is possible to crush and squeeze out the smaller

hypertrophied lymph follicles in the same way that similar bodies are expressed from the conjunctiva. I have employed this instrument during the past two years, and I believe it has a distinct place in dealing with diffuse adenitis of the pharynx.

Investigation of the sulcus about the eustachian tubes is made with the finger, and any adhesions broken up. If necessary, a small ring curette may be used. Sponges are now placed in the pharynx until the bleeding is checked. As a final step, after inspection of the tonsil beds, the wounded surfaces, both of the pharynx and between the pillars, are swabbed with pure compound tincture of benzoin. This seems to allay the first burning pain which follows these operations. I do not remember who first suggested its use, but it is not original with myself. Beck³⁰ is, so far as I am informed, the only writer who has advocated operating on adenoids under direct inspection. He uses rubber catheters passed through the nose and out of the mouth, where they are held so as to retract the velum.

I believe my method gives quite as good a field of operation, and does away with the catheters, which must to a considerable extent block the nose and hinder the escape of blood by this channel. For this reason they seem to me objectionable.

CONCLUSIONS.

1. Eye adenoids (follicular conjunctivitis) indicate the existence of throat adenoids.
2. Hasty and rough surgery in the throat is productive of irreparable damage.
3. Adenectomy should be performed, as far as possible, under direct observation.
4. The roller forceps for diffuse pharyngeal adenoids is of value because it removes them with a minimum amount of damage to the mucous membrane.
5. The silver clip is the best general method of controlling tonsillar bleeding.

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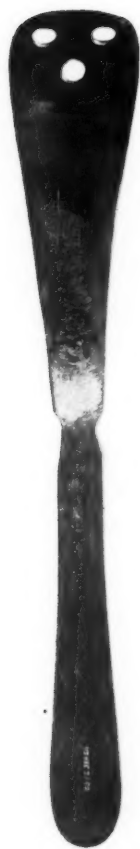


FIGURE 1.

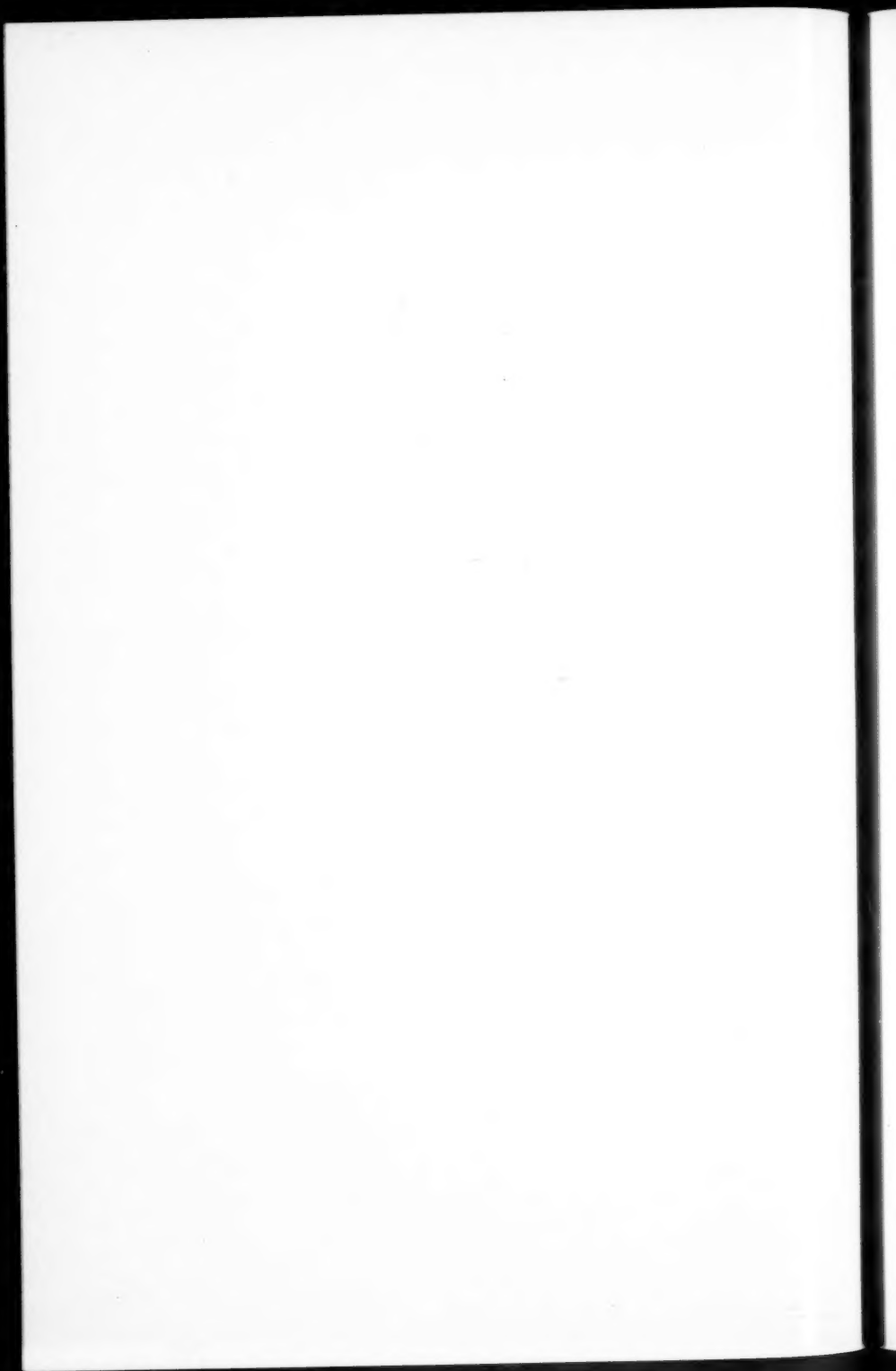




FIGURE 2.

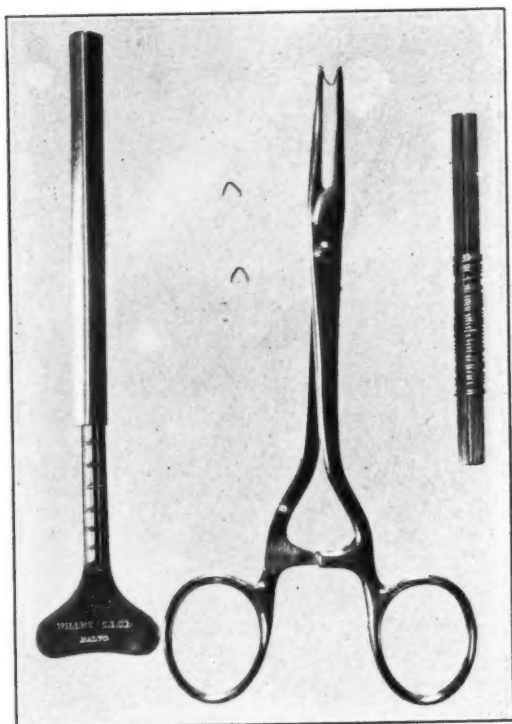


FIGURE 3.

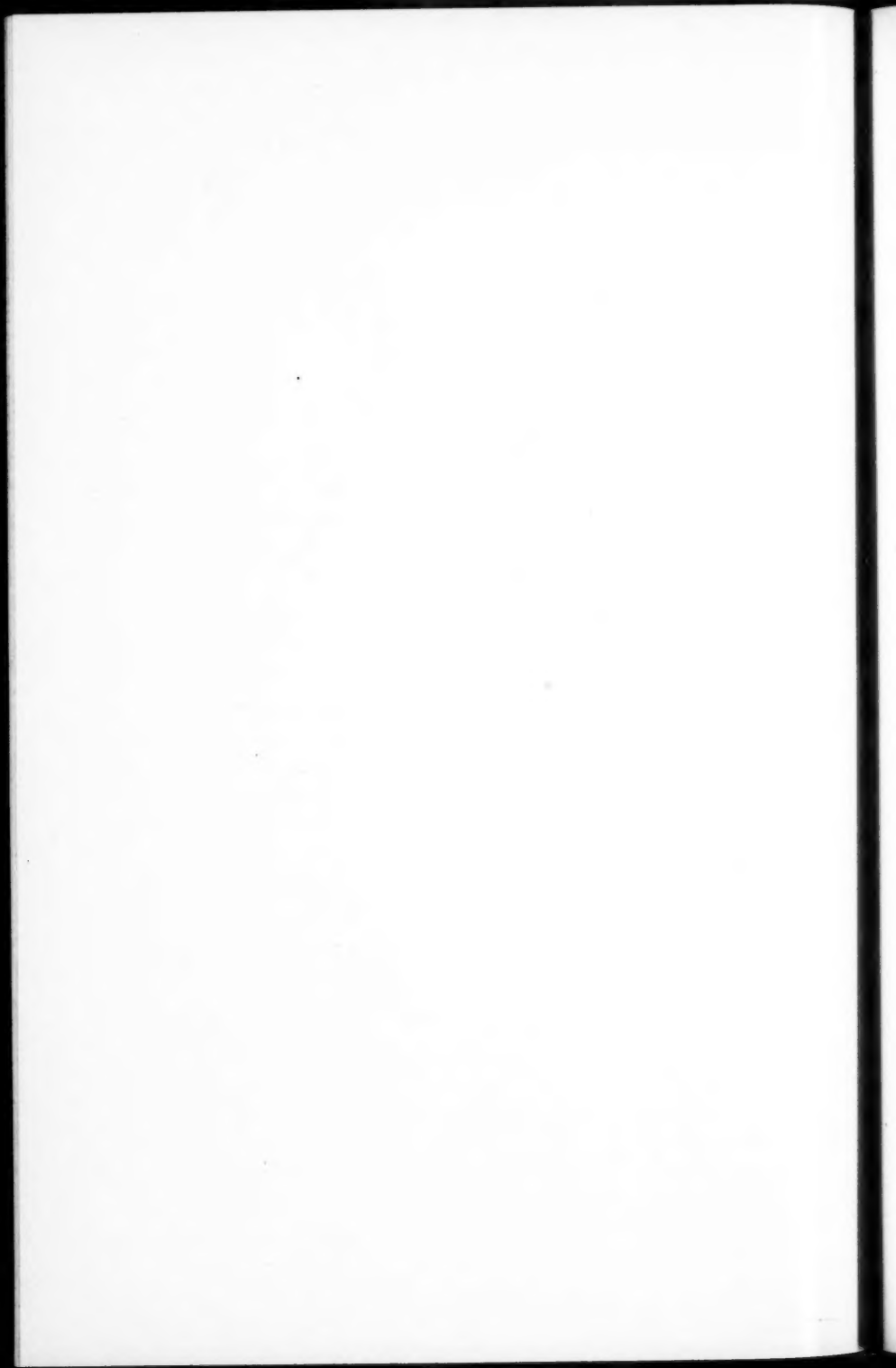




FIGURE 4.



FIGURE 5.



LVI.

THE VACCINE TREATMENT OF SUPPURATIVE
OTITIS MEDIA.*

By GEORGE MORRISON COATES, A. B., M. D.,

PHILADELPHIA.

Before presenting this paper I would like to say a few words as to the manner in which I became interested in the vaccine treatment of suppurative otitis media, and to admit that I am somewhat of an enthusiast. My deductions, therefore, as to the value of this form of therapy may be taken, if you see fit, with a certain allowance for the rose colored spectacles I may be presumed to be looking through. No one realizes more fully than I do that it is only too easy to see the kind of results one wishes for when one becomes an optimist in regard to a certain form of therapy; and too often unreliable statistics are given out, due to the desire of the therapist, honest though he may be, to prove the point he is interested in. Therefore, in seriously undertaking the clinical investigation of this subject, the tests were purposely made as rigid as possible by, as a rule, excluding other forms of treatment during the administration of bacterial vaccines, so that the results should have some weight in the consideration of the subject.

Though much impressed with the possible value of vaccine therapy in the management of suppurative diseases of the ear when Wright first read his epoch-making paper, it was some years before the clinical application was taken up seriously, although from time to time good results were obtained in ear cases with the use of autogenous vaccines. The greatest draw-

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back was the difficulty in getting efficient vaccines made, since I am not myself a bacteriologist, and had to rely on our already overworked hospital laboratories. In the last year or two, however, the making of vaccines has been so much simplified that a good laboratory assistant, pathologic resident or clinical assistant can be readily trained to do efficient work; and also the use of stock suspensions, either commercial or of home-make, has proven of much value. Indeed, the first series of cases I observed was one of sixty-three consecutive suppurating ear cases treated just as they came to the out patient department of the Pennsylvania Hospital with a well known brand of commercial vaccine, and the results were so striking that I have followed the practice in private work with good results, and have undertaken a series of chronic ears treated with autogenous vaccines for comparison, with the results, so far, in favor of the former; but for this I think there are various good reasons.

Since my title is the Vaccine Treatment of Suppurative Otitis Media, I will consider it under two headings, the acute (including the subacute), and the chronic types. Since it is impossible to make a sharp differentiation of these two classes, I have accepted, for the purposes of this paper, the arbitrary ruling that any unchecked discharge of over six weeks' duration belongs to the chronic class. I must also state that I shall confine myself entirely to the clinical side of the subject.

THE ACUTE CASES.

As I have frequently pointed out, when discussing this subject, we must not forget that most of these recover in a short time with any of the accepted forms of treatment, or even without any, and that, therefore, vaccines must not be given too much credit. On the other hand, we all, I suppose, see some of these cases that prove intractable, either from the fact that the opening in the membrana tympani fails to remain patulous and provide sufficient drainage, or that the discharge, in spite of constant effort, continues to flow and the case approaches the limits of the acute class without an arrest being effected. It is in this class of cases that a simple mastoidectomy or antrotomy is often advocated, in order to provide adequate drainage other than through the membrane, with the object of conserving the hearing and putting a period

to the discharge. It is in this class of cases, also, that Mr. Heath's so-called conservative radical operation seems to have its greatest success. In view of the fact that so many of these cases can be successfully coped with by standard methods, it has never seemed to me worth while to employ vaccines as a routine or until I begin to get dissatisfied with the progress of the case, and then I have rarely been disappointed in the results obtained. Equally good results may be obtained with the autogenous or commercial products, though the preference should be given the former where obtainable, since their use is undoubtedly more accurate and scientific.

Conceding that the given case has had appropriate treatment for from a few days to a few weeks without improvement sufficient to justify the aurist in continuing the waiting policy, the vaccine treatment should be given consideration, since, at the worst, it can do no harm. In this connection it may be stated that no untoward result, except one which will be mentioned later, has ever been observed by the writer in the treatment of perhaps two hundred or more cases, necessitating the giving of over one thousand injections. Having resolved upon the use of an autogenous vaccine, such being procurable, it is first necessary to obtain an uncontaminated culture of the causative organism from the seat of disease, and I know no better technic than that recently published by Haskin of New York. All discharge is removed from the canal by gentle swabbing or by suction, and the canal and drum head sterilized with ninety per cent alcohol, with the addition of bichlorid 1 to 8,000, if thought advisable. If there is not an existing perforation, of course free incision must be done. Pus from the middle ear is now forced out by tympanic inflation or aspirated with the otoscope, and a small portion transferred with a platinum loop or cotton wound probe to an agar slant, which is then sent to the laboratory for incubation. The ordinary cotton-tipped wooden applicator usually furnished for the purpose is nearly useless for ear cases, as it is too large and clumsy and thus easily contaminated, or it may be impossible to reach the perforation, much less to pass through it. In 1911 Dr. Nagle of Boston gave out the technic by which she was able to make very successful vaccines. This was simply to incubate the cultures till the height of the growth was nearly reached, when it was

washed off with normal saline solution, sterilized and counted. This method does not take into account conditions where there is more than one organism present—all are grown together, apparently. Most trained bacteriologists prefer to plate out the different organisms found, subculture them and then, if desirable, make the mixture afterwards. By this method much greater accuracy in dosage can be obtained, and it is the method we have followed.

Dosage is an arbitrary matter that must depend upon conditions of age, size and type of organism used. As a general rule, for an adult, about five hundred million staphylococci, *B. pyocyaneus* or diphtheroid, and from thirty to fifty million of the other organisms, are used for the initial dose. This is reduced to about a sixth for a child under three years of age, and increased for the varying ages in proportion up to maturity. The injection is made beneath the skin, after sterilizing with alcohol or tincture of iodine, with a fine hypodermic needle. The use of alcohol is preferable, because it does not obscure the following local reaction, which is used as a guide for the succeeding doses. As a rule these are given every three or four days, and the aim is to increase each one to keep about the reaction point, it being thought that the immunity raised in this way is the best and that it does not subject the patient to the danger of the so-called negative phase, the result of overtreatment or of slow immunization. Anaphylactic reactions have not been observed. In a case that responds favorably we expect to get, following the first dose, and occasionally the second, a local areola about the site of injection, which is usually the upper arm, varying in size from two to four inches, appearing in from ten to fifteen hours and lasting as long as forty-eight, accompanied by some slight induration and tenderness. Sometimes there is no local reaction at all. A general reaction may be obtained consisting in a slight rise of temperature, headache, possibly chilly sensations and lassitude for a few hours. In the ear itself the discharge usually increases at first, becomes thinner, and then may cease altogether. Secondary injections, if the dose is right, seldom show any marked reactions.

Homemade laboratory stock vaccines may be substituted for the autogenous product where available, providing the infecting organism can be determined, and often good results

are thus obtained. The advantage is that treatment can be started at once instead of waiting seventy-two hours or more while the autogenous vaccine is in course of preparation. This does not contraindicate the administration of the latter when prepared, provided the case is not already cured by that time. It is our custom at the Pennsylvania and Polyclinic Hospitals, when a good potent vaccine is obtained, to keep all that is left over for use in this manner, and many times it has proved most serviceable, saving the time and trouble of preparing a fresh vaccine. So uniform has been our success with these two methods that if great improvement is not noted after a few injections, we consider our vaccine a failure or nonpotent, and proceed to make a new one from a fresh culture. At this time it may be found, also, that the type of the infecting organism has changed.

A third most useful procedure is the use of the much abused commercial mixed vaccine. Theoretically not scientific in its application, it nevertheless has many cures to its credit, and can be used where the two other forms of vaccine are not available, being kept in bulk in the aurist's medicine cabinet or instrument bag. These vaccines, usually called mixed catarrhal, or some such name, contain five or six of the commoner varieties of pusproducing organisms, and will check the infection in most acute aural suppurations. They are cheap, easily obtainable, keep well, and are always at hand for emergencies and for the use of the practitioner without access to a laboratory, or for patients who cannot afford even the five dollar fee now charged by many laboratories for the autogenous product. As a rule, these mixed vaccines contain the streptococcus, staphylococcus aureus and albus, pneumococcus, micrococcus catarrhalis and Friedlander bacillus in varying numbers per cubic centimeter, and there are several reliable makes now on the market. If improvement does not follow in a few days, a culture must be made to determine the infecting agent, for it may be none of those just mentioned as included in the mixture.

Whatever method is used, it seems to be the best practice to give one or two injections of the maximum dose after the ear has become dry, in order to insure permanency. A few typical cases may be cited from many as illustrations.

1. My very first case, five or six years ago, was a three-

year-old child at the Polyclinic with acute suppurative otitis media in one ear, of two days' duration, bulging drum, mastoid tenderness and moderate temperature. Incision released the contained pus, but for three weeks the same condition continued, the incisions, large though they were, closing rapidly and being reopened every few days. Operation was urged but refused, and so an autogenous vaccine was made up. Absolutely all symptoms disappeared after the second dose, and the ear has remained well and dry up to the present time.

2. A girl of eighteen was admitted to the Pennsylvania Hospital as a mastoid case, with aural discharge for ten days, and mild mastoid symptoms, but refused operation, and for two weeks remained in about the same condition. As a culture showed the staphylococcus aureus, a stock laboratory suspension of this organism was administered, and she was discharged well immediately after the second dose.

3. A private case in the country, some distance out of town, had acute suppurative otitis media, and both membrana tympani were incised twice. As the discharge then continued unabated for over two weeks and the hearing was becoming much impaired, and as, under the circumstances, I could not attend to the case personally, the family physician, under my direction, administered mixed commercial vaccine, and three injections were sufficient to clear up the condition.

4. An hysteric boy of eight years came to the dispensary with an acute discharge of two weeks' duration and a very tender canal. He was very hard to control, and after three attempts at ordinary forms of treatment, a mixed commercial vaccine of another make from the preceding was given. Four doses sufficed to give him a dry ear, all earache having disappeared after the second dose, and with infinitely less trouble to all parties than would have occurred with any other form of treatment.

5. A man with an infected traumatic rupture of the drum did not improve under ordinary treatment for three weeks, during which time the perforation enlarged greatly and the discharge became foul. Three doses of the same vaccine as the last gave him a dry ear and one that remained dry.

6. In a series of seventeen acute and subacute cases at the Pennsylvania Hospital in 1913-14, treated with commercial vaccines without other forms of treatment except incision

of the membrana tympani when indicated, one hundred per cent of dry ears were obtained in a short space of time. Several of these cases had fairly well marked mastoid symptoms.

THE CHRONIC CASES.

In dealing with the chronic form of middle ear suppuration we must not forget, in drawing our conclusions as to the value of vaccine therapy, that many of these cases are intermittent in type and are dry for long intervals at a time, and that this condition may occur during the administration and independently of the vaccines. Also that in the presence of extensive bony necrosis or of chronic mastoiditis with cholesteatoma, we cannot expect favorable results without first getting rid of these conditions by surgical means. As an adjunct to the mastoid operation their value has been proved, and according to the reports of Nagle, Haskin and others the same holds good for the otitis media. We must also remember that here, even more than in the acute type, there is often much contamination, and it is difficult at times to pick out the causative organism. Moreover, the type of infection may change from week to week, necessitating the preparation of new vaccines.

In a series of forty-six cases, treated just as they came to the out patient department of the Pennsylvania Hospital, thirty-nine dry ears were obtained by the use of commercial mixed vaccines, with an average of about five doses, or twenty days' treatment. The seven that did not respond to treatment were cultured out and all showed organisms not included in the mixture given—a very evident cause for failure. Most of this series had been treated by ordinary measures for long periods of time without result, and all were observed for a period of three months or more after the cessation of discharge, through the cooperation of the Social Service Department of the hospital.

To check up this work, my assistant, Dr. M. S. Ersner, and the writer last summer undertook a series of cases, selected under the same conditions, with autogenous vaccine treatment; Dr. Ersner making them himself in the laboratory of the Polyclinic Hospital. He had never done this work before, so that the results obtained justify the belief that the process is not such an extremely difficult one for an intelligent man. Some of our failures may also probably be set down to our

early inexperience in this laboratory technic. This series was not so successful as the one just quoted, for, out of twenty-eight cases, dry ears that appeared to be permanent were secured in but a little over forty per cent. In this series a number of our cases were irregular in attendance and some were lost sight of altogether, as the Social Service was too busy at this time to be given all of this extra work of bringing back negligent cases. A number of points were brought home to us, however, that seemed of value. In the first place, cases that were not doing well, on being recultured frequently showed a change in the organism obtained, which might account for the failure of the first vaccine. Suppurating ears complicated by the presence of *bacillus pyocyaneus* are usually considered difficult or impossible to treat satisfactorily with vaccines, as these bacilli are considered, not as causative agents, but as saprophytes. West, of London, is the only authority that could be found in a search of the literature some time ago, that had been successful in these cases. Considerably to our surprise, therefore, in some of our most successful cases this bacillus was present, several times being the only organism recovered. The value of homemade stock vaccines was tested out also, for the vaccine prepared from a case showing a pure culture of staphylococci that was dry after a few injections, was given to four other unsatisfactory staphylococcic infections while awaiting the preparation of a fresh vaccine, and dry ears resulted in all four after a few injections. It must be remembered that these cases were all of the type that had previously resisted forms of treatment other than the radical operation.

The one untoward result observed was in a case not in this series but treated some months before. She had foul discharging ears of many years' duration, an eczematous condition of the canals that nearly occluded them and made it absolutely impossible to inspect the drum membranes, and an enormous infiltration of the auricles, more than doubling their normal size. She was cultured and a vaccine prepared, one dose of which was injected into the arm. The vaccine was a pure streptococcus. She promptly developed at the site of the injection a large abscess which incapacitated her for some time. The vaccine was at once sent back to the laboratory and tested for sterility. It was not sterile, having been under-

heated. This was not one of Dr. Ersner's vaccines, but was made for us before we undertook the preparation of our own vaccines. The sequel is most interesting. The abscess healed uneventfully, and so also did one of the ears, which became dry for the first time in seventeen years. The discharge from the other became very slight and odorless, and the eczema and induration entirely disappeared, so that in a week or so a fine view could be obtained of both middle ears. The auricles became normal in size, soft and pliable, instead of hard and board-like, and all scaling, crusting and itching ceased. Since then we have attempted to dry up the other ear—needless to say with fresh vaccines—but have not yet succeeded.

The treatment of postoperative mastoiditis with vaccines has been used successfully by many surgeons, and I would like, in this connection, to report two recent cases in which this method was used to advantage, and some conclusions that may be drawn from them. Both were complications of chronic suppurative otitis media.

Yetta Fierson, a Russian Jewess, a seamstress by occupation, single and twenty-one years old, had an attack of acute suppurative otitis media in the left ear in February, 1914, following an acute coryza. This was neglected and continued to discharge profusely until she first came under my observation at the Polyclinic Hospital on June 30, 1914, when she presented the following condition: The external canal was filled with a rather thick, offensive and somewhat greenish discharge. A large perforation existed through which protruded a polyp. This was removed and all regular methods of treatment were tried without success in even ameliorating her condition. Granulations were removed several times, and on August 1st we cultured the ear for the purpose of preparing a vaccine, but failed to get a satisfactory growth and had to make a second attempt on August 20th. This showed a pure culture of staphylococcus, and on September 3rd, seven months after the inception of the trouble, and two months after the institution of treatment, she received an initial dose of ninety-five million. On September 5th one hundred and ninety million were given; on the 11th, one hundred and ninety million again. The discharge was less in amount and thicker. The dose was reduced on the 15th, and on the 17th, when the

discharge was again profuse, a new vaccine was started. This was again staphylococcus in pure culture. She failed to return for some time, but at last, on October 29th, she received two hundred and fifty million; November 3rd, six hundred and forty-five million, and on November 7th, twelve hundred and ninety million. At this time only a slight moisture remained, and following another dose of the same size on the 10th, the ear became dry for the first time. On the 14th one more dose, of the same size as the two preceding, was given for immunization, and she was considered ready for dismissal. The vaccines were all made by my assistant, Dr. M. S. Ersner, in the hospital laboratory, under the direction of Dr. John A. Kolmer.

On November 16th, two days after the last dose, she contracted an acute coryza from some exposure, with pain in the left ear, and presented herself at the hospital the next day with a bulging drum, although there was still some of the perforation remaining unclosed, marked mastoid tenderness, swelling and a temperature of 101.4° . The membrane was freely incised. She returned on the 19th with a normal temperature and a profuse discharge, but with her mastoid symptoms more marked. A culture from the aural discharge now showed streptococci in pure culture.

As there was no vacant bed in the Polyclinic, I transferred her to the Pennsylvania Hospital and opened the mastoid on the 20th. It was a typical case of acute mastoiditis of the Bezold type, with perforation at the tip with a small collection of pus beneath and considerable exposure of the lateral sinus. Owing to the extension into the neck and the exposure of the sinus the wound was not closed very tightly, although the upper part was allowed to fill with blood clot.

A culture from the pus in the mastoid, made by Dr. Richardson, resident pathologist, again showed streptococci, and I directed the preparation of a vaccine. This was ready on the 28th of November, and twenty-five million were given, followed by fifty million in three days. The ear became dry after the second dose and the mastoid healed kindly, she being discharged from the hospital on December 5th, although she might have gone at the end of the first week, having been kept for purposes of observation of the vaccine reactions. Two more doses of seventy-five million were given at four-day

intervals for immunity. By December 20th the perforation was closed, and the mastoid wound was healed in three weeks from the operation, with very slight scarring or deformity.

I have recited the history of this case in some detail because it presents some points of interest out of the ordinary. The first part simply illustrates the course towards arrest of the average favorable vaccine case—i. e., a dry ear after from two to six doses. The failure of the first vaccine prepared was probably due to the fact that it was not a potent vaccine, although in what the lack of potency consisted is another question. It may have been overheated in the sterilization, or we may have been using too small a dose. The second staphylococcic vaccine dried the ear in three doses, but the doses were very much larger. Following the acute coryza the suppuration recurred, although this time the infecting organism was a streptococcus. To my mind this must not be considered a failure of the staphylococcus vaccine or in the light of a recurrence, but as a distinct new infection by a different organism, as cultures from the middle ear and mastoid uniformly showed the streptococcus in pure culture. This was further proved by the quick cessation of discharge after two injections of this vaccine and the rapid healing of the wide open mastoid wound, not to mention the almost sudden and complete closure of a rather large perforation which had existed for nearly eleven months and through which large granulation masses had protruded until the vaccine treatment was instituted, when they disappeared to return no more. Hearing is good, although she complains of slight tinnitus, and the appearance of the drum approximates normal.

The second case is that of a fairly well nourished child of fourteen months, who came to the Pennsylvania Hospital November 30, 1914, with a history of both ears discharging for several months, it being impossible to elicit the exact number. Moderate tonsil and adenoid hypertrophies were present. Five days before admission an acute mastoiditis had developed on the left side, and there was a large subperiosteal abscess. Temperature was 100.4°; pulse, 148, and respirations, 44. A medium sized perforation was present in each drum. Marked facial paralysis existed on the left side, the baby being unable to close the eye more than half way and the mouth being very much distorted. This had existed for several days. The

leucocyte count was twenty-three thousand, and a culture from the ear showed streptococcus in pure culture. The mastoid was opened at once, a perforation of the cortex discovered and a large amount of pus evacuated. The mastoid process, what there was of it, was cleaned out and a blood clot dressing used with a small cigarette drain to the aditus. On recovery from the ether, on the subsequent day, the paralysis of the eyelid was somewhat less marked, but on the second day after operation the temperature rose to 106.4° and the child seemed pretty sick.

I think it was an error of judgment to use the blood clot method in a case involving the seventh nerve, and I hastened to repair this by a wide opening of the wound, which it distressed me to do, since it was healing nicely.

Pus taken at the time of the operation showed a pure culture of streptococci, and I had a vaccine made by my resident, Dr. Flick, and held in readiness. There were no other untoward symptoms except a very slight stiffness of the neck without either Kernig or Babinski signs, and the temperature, after staying around 104° for two days, yielded to sponging and reached normal on the fourth day after operation, December 4th. The facial paralysis was steadily improving, the eye closing well at this time. On December 13th five millions of the autogenous streptococcic vaccine were given, with slight local and no general reaction, and the patient left the hospital on the 16th. Further doses were fifteen million on the 16th, fifteen million on the 21st, twenty million on the 30th, thirty-five million on January 6th, and fifty million on January 13th. The left ear ceased discharging after the third dose and the right after the fifth. The intervals between treatments were longer, I believe, than is good practice, but the parents were very indifferent and it was difficult to get them to return at the proper times. The mastoid wound was closed in with little deformity in less than three weeks, and at that time only a trace of the paralysis lingered and the child had increased tremendously in weight and strength.

The feature of the case that I wish to call attention to is not the fact that the ear operated upon ceased discharging fairly promptly, nor that the wide-open wound healed in a short time, nor yet that the facial paralysis disappeared. All these happen frequently, but the drainage of one ear through

the mastoid does not cause cessation of discharge from the opposite one, and I think the vaccine must be given credit for that much. It is worthy of note that the ear on the unoperated side was ten days longer in drying than was the other, due, doubtless, to the better drainage in the latter. There is one reason for the clearing up of the right, or unoperated, ear that is a possible explanation aside from the vaccine. That is, the fact of the rapid improvement in the child's general health following the operation, she having soon become rosy in color and having put on weight at an amazing rate. It is, of course, well recognized that improvement in general health is a great help towards the cure of a suppurating middle ear. In this case no local treatment whatever was used, the child being very unruly and difficult to handle. I am inclined to attribute the arrest of the discharge to the vaccine rather than to the child's physical condition, and believe that the improvement in her general health was largely due to this form of therapy, as it has been noted by Nagle, Haskin and other observers, and I can confirm it myself, that there is a frequent gain in weight and general improvement in condition following the administration of vaccines.

In discussing the results of vaccine therapy, at least in these cases, I have been careful not to use the word cured, knowing full well that relapses may occur and that the immunity established is of uncertain duration—that reinfections are prone to take place, as in all of our chronic suppurative cases. So, as we use the word "arrested" in pulmonary tuberculosis, and "relative cure" or "without symptoms of recurrence" in cancer, we must use some term in otitis media less definite than cure, although I believe these cases, many of them, to be really cured, and that subsequent outbreaks of suppuration are due to a repetition of the original process of infection, one that is liable to happen to any ear. This is what happened to the first case reported, I think, as the second attack was due to a different organism, the streptococcus. And I think, further, that if it could be tested out, we would have found her immunity to the staphylococcus active enough to have prevented a reinfection from that type of organism.

I want to say one word about the dosage used. It will be noted that in the first case we used a minimum initial dose of ninety-five million staphylococci, and a maximum dose of

twelve hundred and ninety million was given without producing any marked reaction. Larger doses of the staphylococcus group are necessary and can be used with more safety than any of the other organisms, and smaller doses of the streptococcus, as shown in our postoperative treatment, where the starting dose was but twenty-five million in the adult and the largest dose seventy-five million, also given without reaction. In fact, it has been of rare occurrence in my vaccine work to obtain any reaction other than a small area of congestion about the site of injection, lasting a day or two, with occasionally a slight rise of temperature or a little headache. The larger the dose the patient will stand without severe reaction, the better the result will be; but of course that must be regulated, not only according to the organism employed, but by the condition of the patient, age, size, etc. In the fourteen-month infant the initial dose was five million and increased five million about every fourth day up to fifty million, though her irregularity of attendance somewhat prolonged the treatment.

It has become my usual habit, when finding pus in the mastoid, to have a vaccine prepared and held in readiness for emergencies, or for treatment should convalescence be unduly prolonged, although these two cases are the first of this kind that I have used them in. In a well ordered laboratory it is not a matter of great difficulty or loss of time, and even if the vaccine is never needed, nothing is lost. And, besides, it may be held for stock use.

Of course there is nothing new in this treatment of post-operative mastoiditis and chronic suppurative otitis media with vaccines. Many have used the method, but there have not been many reports published that I can find. Braislin, in 1913, reported six cases of complicated mastoiditis so treated, with satisfactory results in five. And still earlier, in 1910, McKernon reported the satisfactory employment of autogenous bacterins in cases of mastoiditis complicating scarlet fever and measles, in which type of case he found ordinarily very much delayed healing, while with the use of bacterins the time of convalescence was shortened to about that required for healing in cases not complicating the exanthemata. He notes also, as might be expected, from the shorter time required for healing, that the resultant scar was very much

less disfiguring, and that the discharge from the middle ear was easily controlled and the membrana tympani rapidly restored to normal.

Of course failures with vaccine treatment of any disease will occur—there is no such thing as a cure-all; and failures may be due to excessive necrosis, chronic mastoiditis and cholesteatoma, possibly labyrinthitis with insufficient drainage, or defective drainage from the middle ear itself, and most frequently, I think, to improperly prepared or administered vaccine. It is no easy thing to get the underlying organism from its recesses in the middle ear without contamination; the vaccine must be skillfully prepared and especially not overheated in sterilization, or its potency will be reduced or destroyed. It is needless to remark that neither must it be understerilized, or severe reaction and infection will result.

LVII.

A CASE OF RIGHT ABDUCENS PARALYSIS FOLLOWING ACUTE MASTOIDITIS—GRADENIGO'S SYNDROME.

By HARRY L. MYERS, M. D.,

NORFOLK.

This case is reported, not because of its being unique, but rather because of its being a typical example of that group of symptoms and functional disturbances which Gradenigo has described, and which are known to us as Gradenigo's syndrome. The principal manifestations are purulent discharge from the ear, abducens paralysis, neuralgia, pain over the frontal and parietal regions. As this was the first case of the kind in my experience, I searched the limited amount of literature at my disposal, in the hope of finding some explanation for its occurrence, and was rewarded by finding a most excellent article by Dr. Harold Hays, which he read before the New York Academy of Medicine, Section on Otol-ogy, in February, 1913, giving an excellent digest of the sub-ject up to that time.

Dr. Hays reports Dr. Chas. E. Perkins as having had six cases during the winter of 1913, and that he had collected ninety-five from the literature. He also reports a most inter-esting case from the pen of Dr. John R. Page, seen in the service of Dr. Robert Lewis at the New York Eye and Ear Infirmary.

This case was particularly interesting, as the signs and symptoms were indicative of quite a grave condition—pain over right side of head, nausea and vomiting for six days, free purulent discharge from canal, temperature varying from 100° to 105°, slight traces of albumin in urine, slight papil-litis in right eye and diplopia, developing six days previous. Despite these symptoms there was no mastoid tenderness at any time, but mastoidectomy was performed on account of

the sixth nerve paralysis, the high temperature, peculiar symptoms, etc. "The mastoid was found to be quite sclerotic, with only a few fairly large cells which were filled with granulations. No free pus was found; the sinus was exposed throughout a great part. No dura was exposed. The antrum was opened and curetted out, the tip was completely removed." Lumbar puncture was performed on the table, and fifteen cubic centimeters of clear fluid was withdrawn—this was free from albumin, and the culture from it was negative after twenty-four hours. The following day temperature was 101°, discharge lessened, patient reports diplopia less marked. There is a well marked nystagmus on rotation of eye to left. Patient went on to speedy recovery.

Quoting further from Dr. Hays' article, Perkins in his paper remarks that intense headache, "especially in frontal region, severe pain in eye or deep in orbit, neuralgia of the fifth nerve, or paralysis of some of the muscles supplied by it, are symptoms, one or more of which have been noticed in fifty-five out of the ninety-five cases reported." This means that there is some interference with the Gasserian ganglion by the process going on at the apex of the petrous bone.

Dr. John Dunn has kindly allowed me to append brief notes of three cases he has seen, as follows:

Case 1.—Male, aged seventeen years. Mastoiditis, right side, with sinus involvement. Paralysis complete of the right external rectus, appearing after operation and entirely disappearing after a few weeks.

Case 2.—Girl, aged twenty years. Radical mastoid. There appeared the day following operation, or first noticed at that time, a right internal squint. There was no loss of motion of the right external rectus, but the right eye turned in toward the nose whenever both eyes were used for usual purposes. This condition was still present three or four years after the operation. Dr. Dunn has doubts about this being a typical case, and thinks it might have been an old squint of childhood which had reappeared as the result of the chloroform and bandaging of the right eye. He had seen a similar occurrence in a young man operated on for pterygium, the operator having bandaged the eye after the operation. In this case the refractive error was high, while in his own case it was only 1.0 D.

Case 3.—Female, aged twelve years. Simple mastoid operation; complete paralysis of external rectus of corresponding side. First noticed paralysis three days after operation. When last seen, about one month after operation, the paralysis had practically disappeared. This disappearance was gradual.

In none of Dr. Dunn's cases were there present any symptoms of involvement of the Gasserian ganglion. He mentions the well known fact that herpes zoster ophthalmicus often occurs as a complication of paralysis of one or more eye muscles; more often involving the third than the abducens, however.

Many authors offer testimony of the involvement of the eye muscles and even the facial as a complication of zoster. There was in the case I report, however, no symptoms of this trouble except the intense neuralgia.

My case is as follows: On October 7th, N. D., female, white, aged eight years, was brought to me suffering with acute catarrhal otitis media of the right ear. She had had some pain the previous night, but was comfortable when I saw her. The membrane was pinkish but not bulging, and I advised a cathartic and rest in bed. The child was pale and badly nourished, and gave a history of having had one or two previous attacks of earache at twelve month intervals. The membrane, however, had never ruptured, and the attacks only lasted for three or four days. The tonsils were hypertrophied, ragged and diseased, and there was quite a good sized adenoid hypertrophy; despite this the mother said the child had never had difficulty in breathing. I advised her, however, to bring her back in two weeks, in case she had no trouble with the ear before that time, and I would then remove the tonsils and adenoids. The earache never reappeared, and in about two weeks I removed the tonsils and adenoids under ether, as the ear had apparently become entirely normal, both in appearance and function. The following day patient left the hospital and the same night began to suffer again with pain in right ear. Two days after this I was called, as the pain had not ceased and the temperature was 102°. I found the membrane bulging, and a free paracentesis was done. This relieved pain and a free discharge began.

There was slight tenderness over right mastoid. The after-

noon of the next day the temperature was again 102° , and tenderness was increased. I then sent patient to hospital and opened the right mastoid. No free pus was found, but there was a large cell above and behind the antrum filled with granulation tissue, and the whole cellular structure of the mastoid was beginning to show granulation and was soft and very vascular. The mastoid cells were cleared out and the entire tip removed; the sinus outlined and dura exposed over a small portion of sinus where the inner plate was softened. The sinus looked healthy, and no further bone was removed. The wound was sutured above and packed with iodoform gauze. The operation was performed at noon on October 28th. From this time on for five days patient made rapid improvement, slept well, temperature varying between 99° and 101° , the latter being the highest recorded at any time during her post-operative period. The pulse ranged between 90 and 115, generally about 90.

On the night of November 4th the patient showed great restlessness and was fretful; the temperature, however, showed no important rise, being only 100° , pulse 106, respiration 24. The first dressing had been given on the previous day, and I felt that the restlessness was possibly due to some discomfort from that, so disregarded it.

November 5th. Patient very restless, fretful and nervous, and complaining of great pain over supraorbital region and in right eye. Wound dressed, sutures removed—found everything in good condition. Had blood examination made for malarial parasite on account of the neuralgia. This was negative. Aspirin, grains two, controlled headache. Paroxysmal neuralgic attack in brow and extending to right ear recurred about 1 a. m., lasted a short while, and patient slept latter part of night; and from this time to afternoon of next day, patient was bright and comfortable. At 6:30 p. m., however, she had a slight return of pain, which quickly subsided under two grains of aspirin.

November 7th. No discomfort in forenoon, but return of neuralgia, and quite severe, at 1:30 p. m., lasting at intervals until 9 p. m., despite aspirin.

November 8th. Patient comfortable, wound dressed; temperature, normal; pulse, 88; respiration, 20. Allowed to sit up.

November 9th. Patient had a good day and night. Temperature, normal. Patient allowed to go home.

From this time the patient was brought to my office every other day for dressing, and her mother reported that while she had had no rise of temperature or other signs of trouble, her neuralgia came on more or less severely every afternoon. The child's appearance was not good, and she showed the effect of suffering, which was so great at times that it became necessary to use one-eighth grain of codein with the aspirin to obtain relief.

On November 26th, nearly one month after the operation, and more than three weeks after the neuralgic symptoms appeared, she complained of diplopia, and I discovered that there was complete paralysis of the external rectus muscle of the right eye. On account of this unusual and, to me, alarming occurrence, her persistent headaches and her ill appearance, I feared a cerebral complication, and brought her again to the hospital. There an exhaustive neurologic examination was made by Dr. William B. Newcomb, without throwing any light on the trouble. The sensory and motor conditions were perfect, reflexes normal, eye grounds and pupillary reflexes normal, the only abnormality being the right abducens paralysis and the affection of the fifth nerve. Lumbar puncture was done, draining off several cubic centimeters of perfectly clear fluid, under no pressure, which proved sterile. Blood test showed no great leucocytosis. Temperature, 98°; pulse, 88; respiration, 22. Patient was given aspirin, grains two, every four hours; urotropin, grains five, twice daily. Codein sulphat, grain one-eighth, p. r. n., to control neuralgia.

She was very bright between the paroxysms of pain. Temperature remained normal, and under the treatment, supplemented by syr. ferri. iodid, her attacks grew less severe and frequent until November 23rd, when they disappeared altogether and she was looking very much better. She was allowed to return home on November 27th. There has been no recurrence of the attacks, the paralysis has gradually improved, and at this time is almost unnoticeable. The child is rosy and well.

The etiology of this peculiar and alarming train of symptoms, especially alarming when occurring in conjunction with

mastoiditis or following operative procedure for the same, is unfortunately obscure. We know the general etiology of acute acquired paralysis of the ocular muscles to be either intoxication, infection or traumatism. I am inclined to the belief that intoxication or toxemia is the underlying cause of these cases, together with traumatism when the mastoid is sclerotic, and considerable force must be applied by chisel and mallet to open the bone. In my case, however, no force was necessary, as the bone was soft and the principal work was done with curette.

We are all familiar with the fact that ophthalmoplegia externa occurs in lead poisoning, alcoholism, ptomaine poisoning, etc. It has also occurred in migraine—here the symptoms of neuralgia almost always precede for a long period the paralysis of the ocular muscles. The intoxication theory at least seems to fit my case as a general etiologic cause, but just why the fifth and sixth nerves should be the only ones affected in this class of cases is to me most obscure. If we are willing to admit traumatism as the cause, the explanation would be simpler, as the Gasserian ganglion and the sixth nerve are very close together at the apex of the petrous bone, and an effusion in this region from traumatism could explain the involvement of the two nerves. The purulent otitis media, the third symptom of the syndrome, could only affect these nerves by direct extension to the dura or brain at the apex of the petrous bone. However, the mildness of the nervous symptoms in my case would certainly seem to exclude this, or it must affect them indirectly by the toxemia produced. Had there been evidences of herpes zoster ophthalmicus, I should have better understood the paralysis of the abducens. I admit that this may have been a typical case of zoster, but as I believe that toxemia is a great factor in this, it brings me back to the same conclusion as to etiology.

Gradenigo's conclusion is that from some cause a circumscribed leptomeningitis is produced at the tip of the petrous bone. Lubet Berbon objects to the theory of intracranial lesion, and believes its origin to be reflex. Bonnier concurs in this opinion. Many celebrated authorities believe that sinus involvement or intracranial lesion of some kind probably exists, among these Habermann and Jurgensmeyer. Urbantschitsch rather holds to this theory, but admits possibility of

reflex cause. Spira has observed it following la grippe. Schimanowski reports a case in the course of a diffused external otitis. Geronzi believes it due to toxemia. Finally, Baratoux, in the *Archives of Laryngology*, after a detailed historic study of the question, concludes that it is reflex in origin. The advent of these symptoms into a case one has operated upon for what seems to be an ordinary one of simple mastoiditis, must necessarily be somewhat alarming, and a wider study and discussion of this subject will, I am sure, not be without profit to every otologist.

LVIII.

A CASE OF TERATOMA OF THE TONSILLAR SPACE
REMOVED FROM THE THROAT OF A BOY
TWO DAYS OLD.

By WILLIAM C. BRAISLIN, M. D.,

BROOKLYN.

Congenital tumors may occur at any point of the body, and while not uncommon about the head and neck, they seem to have been reported in the throat with extreme rarity; in fact, in a search through the catalogue of the Surgeon General's Library at Washington, I have been unable to find a case of teratoma attached, like the following, to, or in the place of a tonsil, as here reported.

Teratoma may be classed, in a sense, with congenital deformities, with which they are at times associated, though the lesser congenital deformities, like supernumerary auricles, unclosed bronchial clefts and others are much more common. The structure of a teratoma usually contains several varieties of extraneous tissues, glandular, cartilaginous, angiomatous, connective, as well as bone, skin, hair, teeth and muscle.

Several years ago I reported before this society¹ a case of teratoma which had completely occluded the external auditory meatus. In that case the tumor was removed by making an incision behind the attachment of the concha and dissecting out the growth subcutaneously. A photomicrograph of a section of the tumor was presented in the report referred to.

A brief history of the case of teratoma of the throat is presented as follows:

I was called in consultation with Dr. Thos. F. Mylod of this city to see a boy, born the preceding day, who was reported to be breathing with difficulty and unable to nurse. The child was breathing noisily, its color was more dusky than that of a healthy infant, and it was evident from its labored breathing, depression of the tissues above the clavicles on inspiration,

restlessness, etc., that an obstruction of a serious nature existed somewhere in the respiratory current. On examining the throat the left tonsil was seen to have the appearance of an enormous hypertrophy, of about the size which one might see in a child of five years with enlarged tonsils. The growth was smooth and rounded, showing no evidence of crypts, and appeared to contain blood vessels of a size larger than is evident in enlarged tonsils. The soft palate was displaced upward and toward the opposite side. The left tonsillar space and the arch of the oropharynx were nearly filled with the foreign growth. Another anomaly of interest was the presence of a bifid uvula. The presence of the enlarged vessels and the unusual appearance of the tumor, together with the fact of its presence in the throat at birth, enabled us to recognize a congenital tumor, and it was named, tentatively, a teratoma. The presence of angiomatous tissue in the growth was suspected, as indeed was later confirmed by the pathologist. With the possibility of fatal or depressing hemorrhage in mind, it was determined to tie off the base of the tumor as a preliminary measure, which was accomplished with two strands of catgut looped around the base, without the aid of a needle. The compression upon the growth which the firmly drawn loops of gut afforded operated at once to partly diminish its obstruction to respiration. The breathing was noticeably freer and the blue color of the baby's skin was less marked. It was, therefore, deemed wise to postpone for a few hours its removal. This was accomplished the next morning, with a wire loop and snare. The bleeding was negligible. The soft palate at once assumed its normal position. Subsequently the child's color became pink. It was reported to me that shortly after, the baby took food without difficulty. The child has been healthy since.

The growth removed, was submitted to Dr. Archibald Murray, of the Hoagland laboratory (at that time also pathologist of the Brooklyn Eye and Ear Hospital), who found in it cartilaginous masses, extraneous glandular tissue, angiomatous tissue and other evidences which led him to make a diagnosis of teratoma.

REFERENCE.

1. Braislin, Wm. C.: Trans. Ninth Annual Meeting, Amer. Laryn., Rhin. and Otol. Soc., p. 116.

LIX.

COMPLETE CLEFT PALATE WITH HARE LIP.

BY OWEN SMITH, M. D.,

PORTLAND, ME.

The members of the American Laryngological, Rhinological and Otological Society who are particularly interested in oral surgery will, I am sure, be ready to listen to a paper which advocates and describes in not too prolonged detail a promising and, so far as my experience goes, successful method of restoring the floor of the nose and the roof of the mouth in those persons unfortunate enough to be born with cleft palate. At a time when oral surgery had not made its appearance in medical practice as a specialty, the general surgeon with more or less experience undertook to operate upon cases of this sort, but as a unit they have not adopted a uniform or apparently satisfactory means of treating them. For that reason, therefore, the burden of assisting in solving this difficult problem lies at present with those members of this society who specialize in this branch of surgery.

Twelve years ago I began work upon cleft palate as part of my nose and throat surgery, and from the considerable experience thus obtained I have become reasonably familiar with the different underlying principles involved in the surgical and dental methods of treating this condition. Careful study of the operative technic of today shows that three distinct methods, with minor modifications, are being used in the surgery of the palate.

First, elevation or separation of the soft tissues of the palate and suturing the denuded edges together in the middle line, as advocated by Langenbeck and Warren.

Second, flap elevation, reflection or rotation, as advised by Lane.

Third, forcible closing together of the cleft by lateral

pressure and retaining the parts in place by heavy metal sutures, as suggested by Brophy.

A selection must be made from one of these plans, and the rhinologist knowing the functions required of the nose and throat is in a position to judge which one restores the parts more nearly to the normal.

Dr. Fillebrown, formerly professor of dental surgery at Harvard University, for many years used quite successfully the first method with his modifications, but was compelled to wait until the patient was some months old, six or more, before attempting operation. Even then failures to get union were frequent, and long disuse of the muscles made functional restoration of the parts impossible. Professor Brophy of Chicago, also a dentist, designed the third plan, and was quite successful in getting union in very young infants. The superiority of the second or Lane method of operation is, in my opinion, so great that I hope this paper will be instrumental in its becoming more generally adopted in this country and that it will receive the endorsement of this society. Having operated upon more than two hundred cases and carefully tried all three plans of procedure, I can unreservedly commend the operation suggested by Lane. I have watched Sir Arbuthnot and Dr. Fillebrown at their work and have seen their results. I have not seen Professor Brophy operate, but have had an opportunity to examine three cases presented by him before the American Medical Association. All of these presented the same defect that my own cases operated upon by his method had, and, together with other faults, caused me to abandon it.

My statement that the general surgeon has not as yet agreed upon anything like a uniform and satisfactory operation for cleft palate is true. The reason is easily explained and as one would expect.

A sufficient number of cases would hardly present themselves to any one general surgeon to give him much experience in this line of operations. Inexperience lends itself to faulty technic. Faulty technic results in failure. Failure to succeed with one operation tends to turn the operator's mind to another, and in this way he does not perfect himself in any. The natural and certain difficulties of working within the mouth, especially the mouth of an infant a few days old, are

enough to test the skill and patience of anyone, without the added perplexities of a complicated method. For that reason simplicity is desirable. Although it is difficult to carry a plan of all the different flaps of the Lane operation in one's mind, the method of performing the operation is simple, and the instruments and needles used are those commonly employed by surgeons in other work. Its principles are surgical and easily understood. For the past nine years I have used Lane's operation in every case, and although designed by him for and more suited to be used upon infants during the first few days or months after birth, I have operated at all ages from four days, the youngest case, to sixteen years, the oldest one. The average as to age I should say to be about four months.

In any operation for cleft palate the operator should strive to obtain free nasal passages, to have open and equal nasal orifices, a symmetrical face, a low arched hard palate, and a full length and flexible soft palate. It is not enough simply to close the cleft and repair the lip. To attain these results an early operation is absolutely necessary, no matter whether the Lane or Brophy method are utilized. Brophy's operation does not get the low flat roof to the mouth which is necessary to free nasal passages, and the soft palate needs to be repaired later by some flap operation, even when his method is used on the hard palate.

The most important reason for an early operation in these cases, one which I have not seen mentioned elsewhere, is the large number that die before they reach the age when they would be ready for operation by the older methods. My experience leads me to believe that fifty or sixty per cent die of inanition within the first six or eight months of infancy, if the cleft is not closed by some method. The mortality from early operation by the older surgeons was so great that they were forced to abandon it. In contradistinction, Lane and Brophy did not have any large per cent of deaths from their work, and in my own series of cases by their methods I have not yet had a single fatality.

If from fifty to sixty per cent of these unfortunates die of starvation if unoperated upon, an occasional failure from operation itself ought not to discourage the operator. The sooner after birth the operation is performed the less the

hemorrhage, while the shock to the nervous system will be very slight. The digestion, which is normal at birth, easily becomes impaired by the necessary means of feeding.

The muscles of the throat after the early operation begin their activity at once and do not have time to atrophy. This atrophy takes place where operation is delayed, and the eustachian tube suffers from this disuse of the muscles. The early formation of a fibrous band between the edges of the cleft by contraction begin at once to mould the twisted face into its proper position. Before the teeth erupt an opportunity is offered to get a wider flap by extending the incision outside of the alveolus. The immediate repair of the lip adds another factor in restoring the palatal processes to their normal place.

The description of the Lane operation, which I am about to present, shows the one that I have done for many years. It tells how I do it, and is not an attempt to improve upon Lane's description or operation. I shall not describe any of his special flaps or designs for unusual cases. No one with a thorough understanding of the method that I hope to explain will have any trouble in mastering special details, which are fully described elsewhere.

Sir W. Arbuthnot Lane, London, has given to the world three great surgical discoveries, viz.: His method of treating fractures, his work on the large intestine, and his operation for cleft palate. In two monographs, published by the Medical Publishing Company, London, one in 1905, the other in 1908, he clearly and fully describes his operation and gives the reasons for its being. The illustrations and drawings make the text easily understood, and a description of the flaps, adapted to every degree and variety of deformity, are included in the article.

A few years ago I made a special visit to London to study firsthand Lane's work. He was kind enough to give me all the attention necessary for a thorough understanding of his operation and make clear certain points that seemed obscure to me. Since that visit I have used his operation with increasing confidence in its value. From that time I have watched the journals and textbooks, expecting that someone with more experience and greater attainments than I have would bring to the attention of the profession, particularly our special branch of it, the unusual merit of this addition to our

surgery. Some recent publications have not only failed to do this, but have shown such lack of understanding of the principles of the operation, that I hope in part to counteract their bad influence.

The operation is designed to bridge over the cleft by means of mucoperiosteal flaps from the bony palate in front, and the mucous membrane and submucous tissue from the muscular or soft palate behind. Flaps properly formed, when placed in position over the cleft, present their raw surfaces together, one overlapping the other. Fine silk sutures are used, and when tied they unite in this way the flaps and form a new, strong and complete palate. Not infrequently, even at birth, the free border of the septum will be found ulcerated. This ulcer is very slow to heal under ordinary treatment. To hasten the healing I have curetted the ulcerated surface and dissected the mucous membrane up on both sides of the septum until material enough is obtained for a flap, which is pulled down and sutured over the free edge of the curetted septum. By this simple operation tedious waiting is avoided. It is never safe to operate while the ulcer is present. For some time I have thought that it would be wiser to divide the operation into two sittings. This is particularly true where the cleft is a very wide one. In this way one could take better advantage of the blood supply. I have heard that Lane has recently adopted this plan in his operations, but have not the information directly from him.

Before beginning this dissection, a very careful study of the palatal processes should be made and advantage taken of the wider one to be used for the flap to be reflected. If the septum be continuous with the palatal process on one side, the mucous membrane of the septum may be elevated with that of the process itself and used as part of the elevated flap. It has substance enough for the elevated flap, but not enough for the one to be reflected.

OPERATION.

Outline the flap to be reflected, with an incision beginning at the anterior part of the cleft (a), extend it to the outside of the alveolus (b), cutting backward to the posterior end of the process (c), where there is a dimpling of the tissue. From this point (c), by means of sharp scissors, extend the outline

along the groove (d), formed by the cheek and palate, to the posterior and outer free edge of the soft palate (e). Put the palate on the stretch by grasping the uvula (g), and continue the incision inward along the posterior free border of the palate (f) to the edge of the cleft (g). Include the uvula (g) in this incision. After the flap is outlined, raise the mucous membrane and periosteum over the alveolus and hard palate to the edge of the cleft (h, h, h), leaving enough normal tissue at the edge to nourish the flap.

It is best to use the knife in raising the tissue from the alveolus (i, i, i) and the periosteal elevator for the palate (h, h, h). The flap of mucous membrane and submucous tissue (c, d, e, f, g) is then separated and reflected with the one from the hard palate (a, b, c, d, e, f, g). Scissors would better be used to lift the tissue at the dimpling point (c). When the posterior palatine vessels (P) are reached in the dissection, it is important not to cut them, but by careful manipulation they may be dislodged and stretched and turned over with the other tissue of the flap. The saving of these vessels is very important, and may decide the results of the operation. On the opposite side the anterior portion is first elevated, then rotated, while the posterior part is simply elevated to receive the raw surface of the reflected flap beneath it.

For the second flap, begin the incision in front, at the edge of the cleft (2 to 3), and peel the periosteum up from the bone (1) as far back as the junction of hard and soft palate (6). From the point of beginning (1) incise the mucous membrane and periosteum outward and forward over the alveolus to the point just outside of the middle line (3). The incision is then turned backward, outside of the process (4, 4, 4), to include as much of the process as may be necessary to cover the cleft when the flap is rotated inward. This whole area (6, 1, 2, 3, 4, 4, 4) is thus converted into one large mucoperiosteal flap, with the palatal vessels (P) at its base for a blood supply.

The remainder of the flap on this side is formed by grasping the uvula (5) with a mouse toothed forceps, or by first putting a fine silk suture through the uvula and turning it with the rest of the soft palate into the mouth, thus exposing its upper surface. With the soft palate held in this flexed position an incision is made through the mucous membrane and submucous tissue, along the summit of this bent-over

area (6, 7), to the outer and posterior border of the soft palate (7) near the anterior pillar of the pharynx. The incision is then turned at right angles and extended along the free border of the soft palate to the uvula (5). The flap outlined by these two incisions, when completed by raising the mucous membrane and submucous tissue from the underlying muscles, is fan-shaped (6, 8, 5, 7) and doubles the width of the otherwise narrow palate, and makes a raw area on the nasal surface to cover a similar area of raw surface of the first or opposite reflected flap.

The two segments of this flap, one (6, 1, 2, 3, 4, 4, 4) taken from the hard palate, the other segment (6, 7, 5, 8) taken from the soft palate, are then joined together into one large flap (3, 2, 1, 6, 8, 5, 7). This is accomplished by freeing the mucous membrane and submucous tissue from its attachments at the posterior edge of the palatal process (9, 9). The operation is completed by reflecting the flap (a, b, c, d, e, f, g) across the cleft and suturing it in place beneath the flap (3, 2, 1, 6, 8, 5, 7) with a double line of sutures (x, x, x, x, x, x, x). The greatest care should be used not to bruise or buttonhole these delicate structures.

HARE LIP OPERATION.

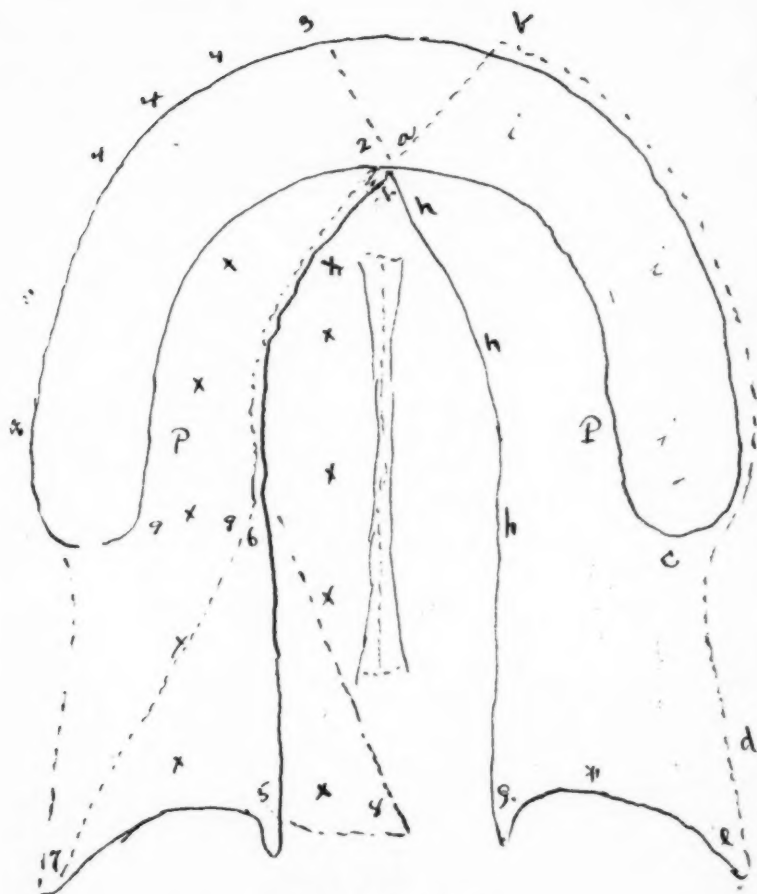
I hesitate to report this operation as my own, knowing too well that it may have been done many times by other surgeons. If that be so, I gladly come forward and recommend it as a very satisfactory method of treating hare lip.

Operation.—The incision begins at the point of attachment of the lip to the alæ of the nose. It follows a line made by the junction of the mucous membrane and the skin (x x x, Figure 1) downward on both segments of the lip to point where it becomes normal in thickness (a a, Figure 1). Over this area the mucous membrane and all of the submucous tissue is dissected away from the muscles of the lip and turned backward into the mouth in one continuous, unbroken piece. The coronary artery is not injured, as the dissection does not include any of the muscle fibers, and therefore there is little or no loss of blood. The suturing begins on the mucous membrane at the upper part, and fine interrupted sutures of silk tied on the inner side of the lip unite it the full length of the new lip. (Figure 2.) The ends of the muscles—or, better,

the muscular portions of the lip—are brought together and held in place by two or more mattress sutures of medium weight silk or linen. These sutures are introduced as follows: Both ends of the silk is threaded with a fine straight needle. Begin on one side, on the inner surface close to the alveolus, well back from the edge of the denuded surface, and carry the needle into the muscle straight for half its thickness, when it is turned sharply inwards, splitting the muscle in two parts; it comes out on the raw surface, is carried across to the other half of the lip, where it is again inserted into the muscles for a third of an inch and then brought out upon the skin surface. The needle on the other end of the same suture follows a similar course near its fellow. In this way a mattress suture (Figure 3) is formed that coapts the parts exactly. Skin sutures are seldom needed to hold the edges, but they may be inserted if there be any doubt about the edges remaining in position. Before the sutures are finally tied it is best to draw the lip into position to see if the original incisions are the proper length. If one or both sides are too short, a little more dissection will correct it.

In the lip splitting operation there is no sacrifice of tissue, and the lip may be operated upon as many times as necessary until the desired effect is obtained.

In double hare lip the intermaxilla carries a section of the lip on its anterior surface. The edge of this part of the lip is treated in the same way as though it were one edge of a single hare lip, and both of the outer parts are brought forward and attached to it. The intermaxilla and the lip attached to it should never be sacrificed. In cases where it has been done the lip sinks in and a most unsightly deformity results. It frequently happens that some months after operation upon the lip and palate, the moulding of the bones of the face into better position gives an altogether different expression to the face from that which appeared at the time of the operation. All that needs to be done in these cases is to extend the primary incision, insert a suture or two, and the expression is restored. It is equally possible that the parts may fail to unite, as there is in some cases a tremendous strain upon the sutures holding them in apposition, but as there has been no sacrifice of tissue, the operation may be repeated as often as desired.



Outline of Operation.





FIGURE 1.



FIGURE 2.



FIGURE 3.



LX.

CHRONIC PURULENT OTITIS MEDIA WITH
SPECIAL REFERENCE TO TUBERCULOSIS.*

BY WENDELL C. PHILLIPS, M. D.,

NEW YORK.

Modern observers in the field of otology have generally agreed that a considerable proportion of all cases of chronic purulent otitis media are tuberculous in character. The diagnosis of the tuberculous taint, however, has largely depended on clinical evidence alone, hence the statistics reported have been more or less biased by the individual opinions of the authors. Only in one class of victims has there been unanimity of opinion. This statement refers to cases in which the aural lesion occurs in conjunction with, and subsequent to, pulmonary or general tuberculosis. These are more common in adults.

Authors of textbooks on the ear almost without exception state that primary local tuberculosis of the middle ear is a rare affection. This has been my opinion until recent years, during which period I have bestowed more careful study on the large amount of clinical material which comes under my observation. Reasoning by exclusion, regarding the nature of the destructive lesions in the temporal bone and ossicles which are characteristic of persistent otorrhea, one is forced to conclude that some underlying dyscrasia must account for their failure to heal spontaneously, and tuberculosis furnishes the most reasonable explanation. Reasoning by analogy, comparing similar lesions in other parts of the bony framework, one is forced to the same conclusion.

On clinical evidence alone I have determined to my own satisfaction that primary local tuberculosis of the soft tissues, ossicles and bony walls of the middle ear is the determining

*Read before the Section on Laryngology, Otology and Rhinology at the sixty-sixth annual session of the American Medical Association, San Francisco, June, 1915.

factor in a large proportion of all persistent otorrheas, especially in young children. This conclusion is attended by one doubt. The clinical history in all cases seems to point to a more or less violent attack of acute purulent otitis media from the streptococcus or pneumococcus, or from exanthematous or other febrile diseases, and always with severe pain. Is it not possible that, after all, the tuberculous lesion is a later development on unresisting mediums? This query furnishes a basis for future investigation.

There is considerable evidence that bilateral lesions occur more frequently in tuberculosis cases, and that multiple perforations of the drum membrane are prone to be tuberculous.

The above remarks refer largely to local tuberculous lesions. The clinical history when the lesions occur as a late manifestation of general tuberculosis is quite distinctive. The onset is without pain and the course is rapid.

Every conscientious clinician welcomes any confirmatory laboratory evidence, and the purpose of this paper is to briefly outline the recent experimental work, some of which has already been published, which has been accomplished at the Manhattan Eye, Ear and Throat Hospital. It is believed that the problem of isolating the tubercle bacillus from chronic ear discharges has been overcome. In the *American Journal of Surgery*, July, 1914, Dr. J. G. Dwyer made the first report regarding the matrix bacteria and cytology of ear discharges, as follows:

A series of cases of otitis media purulenta chronica were taken and the aural discharge subjected to examination as to (1) the bacterial flora, (2) the cellular elements, and (3) the matrix. It was felt that simply examining the discharge for bacteria was quite inadequate, and that by so doing we were probably losing sight of other materials present in the discharge that may be of aid to us in the diagnosis. The present report deals with the work to date with the exception of an investigation as to the presence of bone salts in the discharge and the bearing of their presence on the lesion. The tubercle bacillus investigation is dealt with separately. Dwyer says:

"In our work on the bacteriology of chronic suppurative otitis, the technic employed was, with a few minor differences, the same as that used by Miss Gignoux and the writer

in 1910, when employed on similar work on the tonsil. Smears of the discharge, taken in the way indicated by Dr. Haskin, were made on blood or ascitic fluid plates, after the manner of making streak plates, and were then incubated for twenty-four hours. The different colonies were then fished and stained films were made and the colony recovered on slant agar or in the case of the more fastidious organisms on the richer media, such as blood serum, ascitic agar, etc., and, if they proved to be organisms that were capable of identification morphologically, and were known to have any pathogenic power or even regarded as remotely having this, vaccines were prepared and used even before the final identification of the organisms. Direct smears were also made and stained by aqueous stains and by Gram stains, so as to serve as a check upon the plates. All organisms were studied on the various media and identified.

"In fifty-three cases we found the following organisms: staphylococcus pyogenes aureus, seventeen times; staphylococcus pyogenes albus and citreus, six; streptococcus mucosus, eight; streptococcus hemolyticus, eight; pseudodiphtheria (Hoffman's and xerosis), fifteen; pyocyaneus, sixteen; proteus, five; Klebs-Löffler, one; bacillus mucosus capsulatus, three. The bacillus subtilis and some other air organisms were repeatedly found, but were discarded. In many of the direct smears there were any number of spirochetes found, varying from that of Vincent to the refrigens and those found in the throat. It is my opinion that the true significance of the discharges from the middle ear will not be fully appreciated until an investigation is made of the rôle of these so-called innocent organisms from the throat, the torulæ, spirochetæ, etc., so often found in this class of cases and always discarded. An arbitrary division of bacteria into pathogenic and nonpathogenic varieties is attended with many difficulties in the case of the ear, since potentiality for serious mischief in this organ which so many reputed saphrophytes possess, render such a classification of doubtful expediency. There are perhaps few organs which present a greater variety of bacteria than does the ear, particularly in the chronic forms of disease of this organ. Thus with the above technic, organisms ordinarily looked upon as pathogenic, could be isolated in the big majority of cases, practically in ninety-five

per cent. Some of these cases were of years' duration and in all cases over months, so that the bacterial flora as time went on might have changed considerably, but the fact that pathogenic organisms could so be isolated encouraged us to try the vaccines in these cases. No anaerobic cultures were made and no attempt was made to isolate the acid-fast organisms or by animal inoculations and agglutination experiments to differentiate the various strains of streptococci, as our primary object was to have a practical method of isolation and one that could be easily applied. No attempt was made to differentiate the bacillus butyricus or its allied groups.

"It is well known that in the chronic discharges we find very frequently acid-fast organisms that resemble the tubercle bacillus, which under rigid staining decolorize, and it is probable that these are strains of bacilli that have been acted upon by the bacillus butyricus, an organism found very often in the ear and which is nonpathogenic in itself, but when grown in symbiosis with other organisms change these latter so that they have different staining reactions, and if an organism can be changed in this respect, it is not a far step to assume that it can be changed in other more important respects, as is well known with other sets of organisms.

"With regard to the cellular elements, we think the study of these is well worth while. Under cytology, we may divide the cells into two groups: the epithelial and the mesoblastic. Epithelial cells are meatal, tympanic, or glandular. The commonest type is of course the squame, which in an healthy ear is absolutely confined to the meatus, but in chronic diseases invades the antrotympanic cavity and becomes one of the most striking features of the discharge. These squames fall into two classes—the old and the young. The old are acid-fast, have either no nucleus or the area where the nucleus should be is only a shadow. On the other hand, the young or recently formed squames have large oval or round nuclei, which readily take the stain, are not acid-fast and are easily decolorized. We of course have all grades in between these two extremes. This point may not seem of much importance, but this acid-fast property of old nonnucleated squames affords not only presumptive evidence of a cholesteatomatous mass involving the antrotympanic cavity, assuming, of course, that the specimen was taken from the tympanum and not from the

meatus, but fragments may be mistaken for the tubercle bacillus. The normal tympanic epithelium is seen only in the early acute stage of infection; such epithelium does not occur in chronic discharges, the tympanic lining having been transformed into the squamous or epidermal type.

"We next consider the mesoblastic cells, and these may be divided into the wandering and the fixed cells. The wandering cells are very important. They comprise the leucocytes, the lymphocytes and the plasma cells. The leucocytes and lymphocytes are usually classed as pus cells, but inasmuch as they are unlike in function, structure and significance, some distinctions between them are necessary. The leucocyte of a recent or acute exudate is very sharply defined and the nucleus stains deeply, but degeneration soon sets in and we have well known series of changes which are indicative of the death of the cell. As the discharge becomes chronic, large mononuclear leucocytes become more numerous, in contrast with the very acute discharge, in which the polynuclear cells predominate. The lymphocyte is smaller than the leucocyte, with a slight amount of protoplasm, a large clear nucleus, and stains very deeply. The important thing is that in acute exudate changes about one lymphocyte can be counted to twenty or thirty leucocytes, but when the discharge comes from a granulation source the lymphocytes are strikingly increased, sometimes being equal in number to the leucocytes. Thus the presence and the proportion of these cells afford a reliable evidence of the existence of granulation tissue and the nature of the pusproducing process. They possess little, if any, phagocytic power. It must be remembered, however, that the proportion of lymphocytes in infants is much higher than in adults.

"The next class of cells are the fixed cells, and of these the epithelioid elements are those most frequently found. These cells are derived from the lining of blood and lymph channels and also from the perivascular spaces of the arterioles. They play an important part in the granulomatous formations, especially tuberculosis, etc. Although seen sometimes in acute inflammations, their presence in large numbers is characteristic in chronic discharge of tuberculosis.

"We thus see that an examination of the cellular elements

may be a great aid to diagnosis and prognosis in a chronic purulent otitis.

"Not much need be said about the matrix, except that at times we can demonstrate the flat rhombic crystals of cholesterol and the fatty acids, characteristic of old desquamative changes in cholesteatoma.

"To sum up then shortly, the conditions responsible for chronic discharge from the middle ear are so varied that pathologic accuracy calls for some differentiation. As most frequently happens, granulation tissue is responsible for the pus. Evidence of this is afforded by the presence of leucocytes of all kinds, large, small mononuclear and polynuclear, normal and degenerated, but especially by lymphocytes which are very numerous, while epithelial cells are not uncommon. Bone disease may be marked by the presence of myelocytes or osteoblasts, or chemical analysis shows the presence of an increased amount of bone salts.

"Cholesteatoma is indicated by the presence of closely packed squames with or without bacteria, a distinction that may at first glance appear unnecessary, but is really of great importance, especially when the cells are of antral origin, for a septic cholesteatoma in that situation affords a stronger indication for radical measures than a nonseptic one—an interpretation amply supported by examination of antral contents removed at operation.

"Among chronic discharges we meet with is one which deserves special attention—it is very profuse, fetid, opaque, and like cream. On examination, it is found entirely free generally from cells, either epithelial or septic leucocytic, but consists of throat organisms in an albuminous matrix—not true pus, therefore, but a polymicrobial emulsion. With such a discharge, in which there are spiral and fusiform bacteria of many varieties and no cells, the existence of an active granulation surface can without doubt be excluded. Thus here, active aural measures to do away with the original infection are called for. It is the differentiation and identification of such a condition that will repay you in the knowledge gained. The throat organisms are such as *spirochetæ fetidæ*, *bacillus fusiformis*, *leptothrix*, etc. Also there are the organisms found in pyorrhea alveolaris, in tonsillitis, etc. In acute exacerbations, the influenza bacillus, micrococcus catarrhalis,

etc., are found, but we did not find them in the uncomplicated chronic condition."

Coming more specifically to the presence of the tubercle bacillus in ear discharges the March, 1915, number of the *Laryngoscope* contains a preliminary report of this work by Drs. Cock and Dwyer. Dwyer, pathologist of the Manhattan Eye, Ear and Throat Hospital, has made use of Petroff's medium as the basis for growing the tubercle bacillus in the majority of the cases investigated in the above mentioned hospital. The preparation of Petroff's medium is as follows: Petroff found, after many trials, that a medium containing a whole egg, beef or preferably veal juice and gentian violet gave a uniformly positive result. This medium contains: Two parts of egg (white and yolk); one part of meat juice, and gentian violet sufficient to make the proportion 1:1000.

1. Meat Juice: Five hundred grams of beef or veal are infused into five hundred cubic centimeters of a fifteen per cent solution of glycerin in water; twenty-four hours later the meat is squeezed in a sterile meat press and collected in a sterile beaker.

2. Sterilize the shells of the eggs by immersing for ten minutes in seventy per cent alcohol or by pouring hot water on them. Break the eggs into a sterile beaker and after mixing them well, filter through sterile gauze. Add one part by volume of meat juice.

3. Add sufficient one per cent alcohol gentian violet to make a dilution of 1:1000, take about three cubic centimeters in each sterile tube and inspissate for three successive days; the first at 85° C. (185° F.) until all the medium is solidified, changing the places of the tubes if necessary; the second day and third day not more than one hour, at 75° C. (167° F.). For the bovine type omit the glycerin and infuse the meat twenty-four hours in water. Bovine tubercle bacilli grow in this medium even if it contains glycerin, but on account of popular belief and the above data a medium without glycerin was used.

From a very careful calculation it appears that if a single organism divides in two it will take approximately from six to seven days to grow to a pin point colony and be visible. To confirm this, organisms were isolated by Barber's method and inoculated in a test tube containing gentian violet-egg-meat

juice medium and on the sixth day three pin point colonies were visible.

The strain of tubercle bacilli used in this experiment was well adapted to growth outside the body, having been isolated some two years ago. This experiment shows that under the most favorable conditions it will take at least six days for a single tubercle bacillus to grow to a visible colony.

An improvement on this medium has been devised by Dr. R. H. Miller, of Columbia University, who makes use of glands, lymph nodes, liver, etc., from laboratory animals, as the basis of his medium and thus supplies the tubercle bacillus with its own natural food. His work has not been published. The growth with this medium has been more rapid and apparently appears sooner after inoculation than with the original Petroff medium.

"Reviewing briefly the methods of diagnosis of aural tuberculosis, made use of in the past, we find that the main methods may be tabulated as follows: (1) the microscopic examination of tissue excised from the preotic lymph glands; (2) the microscopic examination of tissue or granulations from the tympanic cavity; (3) the direct morphologic examination of the aural discharge, and (4) the passage of the discharge through laboratory animals—that is, the guinea pig. The first two methods cited require surgical measures and in the opinion of the majority of otologists these operative measures ought to be avoided, and, moreover, are not feasible in the most of our cases. The third method, that of direct morphologic staining, has been used by Cocks and Dwyer with great success as follows:

"The aural discharge was obtained in as large a bulk as possible in a small quantity of normal saline solution. The water used in making up the salt solution was freshly distilled each day in order to be sure that none of the acid-fast organisms present in tap water or in old distilled water could vitiate our results. This discharge was then treated with an equal amount of 15 per cent antiformin and the whole allowed to stand for a varying period, depending on the consistency of the mixture, etc. It was then centrifugalized and the precipitate washed to remove the excess of alkali. Smears, made from the precipitate, were stained by Ziehl-Neelson and Pfaffenheimer's methods. In this way, by examining many smears,

we were able to demonstrate the organism with reasonable certainty. By this method, however, no matter how much care is exercised, there is always an element of uncertainty in morphologic diagnosis alone, as in many of the old chronic suppurating ears the acid-fast epithelioid flakes are apt to be mistaken for tubercle bacilli. These flakes are present in a large proportion of chronic cases, as mentioned below. The fourth method, that of animal experimentation, has always been subject to difficulties and delays. In the first place, the inoculated guinea pig often dies from pyogenic infection; in the second place, one could never be sure that the guinea pig was free from tuberculosis before inoculation. Frequently the pig died from other causes. After the use of antiformin came into vogue, secondary infection of the animal was eliminated, because antiformin destroys all the common pyogenic organisms except the acid-fast group. At best, inoculation experiments require from four to eight weeks, during which valuable time is lost in the treatment of the patient, who frequently escapes from observation, especially if he happens to be ambulatory."

In view of the above difficulties and for the sake of early diagnosis and scientific accuracy, an investigation was made concerning the possibility of cultivating the organism directly from the aural discharge in pure culture, just as with any of the ordinary pyogenic organisms, thus eliminating animal inoculation, inaccuracy of diagnosis, and insuring early and exact diagnosis, so that treatment with tuberculin could be started earlier.

The technic of securing the specimens has been described by Dwyer as follows:

"After obtaining the aural discharge in wide mouthed bottles, it was immediately saturated with sodium chlorid and allowed to stand for from half an hour to an hour. At the end of this time, the bacteria are found floating on the surface. This floating film is then collected with a deflagration spoon in a wide mouth bottle, and an equal volume of normal sodium hydroxid added. The mixture is shaken well, and left for digestion in the incubator at 37° C., for one to two hours, or longer, care being taken to shake it every half hour. The mixture is then neutralized to sterile litmus paper with normal hydrochloric acid, and the sediment is inoculated into

several test tubes. Growth usually occurs in from fifteen to thirty days."

At first no effort was made to differentiate the human and the bovine types, but this is being done with the present specimens. A brief synopsis of the histories follows. Up to date we have examined forty-four cases by the cultural method for tuberculosis, and obtained six positive cases. Three of these six cases were reported by Drs. Dwyer and Cocks in the *Laryngoscope*. The forty-four cases examined for tuberculosis were obtained as follows: Thirty-two were patients taken in the clinic where we were examining all cases of otitis media purulenta chronica in children for tuberculosis. The other twelve cases were from Seaton Hospital and other institutions and were mostly patients with tuberculosis in other parts of the body. Thus far, then, we have examined forty-four patients by culturing the pus from the auditory canal or mastoid wound and have obtained positive results in six cases, or 13.6 per cent. Of the positive cases Dr. Cocks reports in the above mentioned paper the following nine cases:

"Case 1.—Samuel S., aged fourteen years, was first seen on the operating table at the Manhattan Eye and Ear Hospital. He was in for adenoid and tonsil operation. On examination under ether, a small teratoma of the nasopharynx was found. His tonsils were small and buried. They were removed, and the teratoma was excised. At this time we were examining all children with chronic purulent otitis, for tubercle. Finding that this boy had chronic discharging ears, a culture was taken. The patient is undeveloped for his years, but otherwise healthy in appearance. He is a mouth breather due to right side septal deflection. A few small cervical glands are felt on both sides of the neck, in the posterior group. There is no peritonsillar glandular enlargement. His chest is pigeon shaped. Examination of the lungs is negative. A roentgenogram of the chest fails to show signs of tuberculosis. There is moderate purulent discharge from both ears. The left ear has a large, nonmarginal perforation. In the right ear there is a small central perforation. There is nothing suggestive of tuberculosis in either tympanic picture. Pus was washed from the ears into a single flask, and tubercle bacilli cultivated. Under cleansing treatment and instillations of

alcohol, the discharge ceased in the right ear. The left side is still suppurating, though less profusely.

"Case 2.—Frank R., three years old, a patient of Dr. Fowler's in Dr. Phillips' clinic. An accurate history was not obtained from the mother, who was unable to speak English. The child has suffered from a bilateral purulent discharge for two years or more. He has never had any of the ordinary infectious diseases of childhood.

"Examination: Pus in both canals; left drum: oval perforation in front of malleus handle. Right drum: small round central perforation. No enlargement of periotitic or cervical glands was noted. He had adenoids and hypertrophied tonsils. Tubercle bacilli were cultivated from washings from ear.

"Case 3.—An Italian child, four years old, from Dr. Phillips' clinic. Two years ago the child had measles, chickenpox and pneumonia. For nine months he has had a purulent discharge from the right ear. On examination, the external auditory canal was found to be filled with a large polyp. Tubercle bacilli were cultivated by Petroff's method."

The following cases were examined by Dr. Dwyer by the antiformin method. The precipitate from the washings was stained for tubercle.

"Case 4.—Dr. Hubby's patient, in Dr. Phillips' clinic. Child one year old with no family history of tuberculosis. The apparently healthy child had an attack of acute otitis. One week later Dr. Hubby examined the patient and found mastoiditis and facial paralysis. Operation revealed a broken down mastoid, full of pus. Following the operation, the wound showed absolutely no attempt at repair, although the child looked healthy. Pus from the mastoid wound during a postoperative dressing revealed tubercle bacilli. About one month later the child ceased coming to the clinic, and is said to have died from meningitis, presumably tuberculous.

"Case 5.—Dr. H. B. Brown's patient. A young woman, aged twenty, suffering from pulmonary tuberculosis, was sent to the Manhattan Hospital for extreme swelling and edema over the mastoid. The cervical glands on the same side of the neck were markedly enlarged. Investigation showed furunculosis of the external auditory canal. After three injections with a staphylococcus vaccine, the furuncular obstruction disappeared, and it was possible to obtain pus from the sup-

purating middle ear. Smears showed tubercle bacilli. One month's treatment with tuberculin produced a cessation of the aural discharge and complete disappearance of the glandular enlargement.

"Case 6.—Mary M., seven months old, a patient of Dr. W. L. Culbert. Family history negative. Both parents and three other children are living and well. Five weeks before coming to the clinic the child had a purulent discharge from the right ear. Three weeks later, facial paralysis developed. The child had three operations: the first a simple mastoid operation, in March, 1914; the second, for suppurative of the parotid gland; and the third, for removal of enlarged cervical glands. The mastoid wound healed very sluggishly. Pus taken at the time the wound was dressed revealed tubercle bacilli. Dr. Culbert has given the patient tuberculin injections. At present the child is in fine physical condition. The ear, however, still has a slight discharge, and there is a small retroauricular fistula which is almost dry.

"Case 7.—Dr. Haskin's case. J. R., a colored man, aged twenty-nine years, with chronic purulent otitis media. Typical tuberculosis of the ear. Small particles of bone could be picked away. Antiformin method and stained smears showed tubercle bacilli. This patient had tuberculosis of the lungs and was referred to the Otisville Sanitarium.

"Case 8.—Dr. Haskin's case. McG., aged thirty-two years. Onset of suppurative otitis media, without pain and with rapid destruction of drum. The patient's physical appearance was excellent. He has a history of having had a rectal fistula.

"Case 9.—Dr. Dwyer's case, a baby, eighteen months old, whom he operated on for a subperiosteal abscess. There was a sequestrum involving the entire mastoid process. Smears from the pus showed tubercle bacilli. In this case there was a positive von Pirquet reaction. Death ensued from tubercular meningitis.

"Case 10.—M. T., aged five years, came to my clinic November 24, 1914. Patient has had a discharge from the left ear off and on since she had scarlet fever three years ago. Adenoids and tonsils were removed two months before. For the past three months the left ear has been discharging almost constantly. Mucopus not affected by the adenoid and tonsil operation. Dr. Phillips plans to do a radical operation unless

patient is improved by a couple of weeks' treatment. The parents are well. One other child is healthy. Specimens of ear discharge were examined for tubercle bacilli and found positive.

"Case 11.—T. F., five years old. Treated in my service by Dr. Sharp. Otitis media purulenta chronica (left) has existed for two and a half years. There is a constant discharge which started with pertussis and earache. Three other children are all healthy. Patient has adenoids and enlarged tonsils. Referred for adenoid and tonsil operation. Left ear has a small nonmarginal perforation from which a drop of pus oozes. Culture positive.

"Case 12.—H. R., three years old, a patient of Dr. Cocks on the throat service. One and a half years before, patient fell and received traumatism at inner side of eye over lower part of forehead. When first seen patient had a skin fistula at this point communicating with the ethmoid cells. An external radical operation on the ethmoid was performed by Dr. Cocks, and the wound was closed. It has remained dry for one year. While in hospital the patient had a foul discharge from one ear, which was chronic. With probe in the canal I found a defect in the posterior canal wall. Knowing that I was dealing with a case of otitis media purulenta chronica with necrosis of the canal wall, I exposed the mastoid and performed a radical operation. The wound healed and ear became dry. In the past year there has been occasionally some secretion from the middle ear for a few weeks at a time, then the ear heals again and remains dry. The culture was positive.

VERTIGO OF LABYRINTHINE ORIGIN FOLLOWING
A CHRONIC SUPPURATIVE OTITIS MEDIA
WITH CHOLESTEATOMA.*

1ST—SIMPLE MASTOID WITH CURETTAGE OF THE MIDDLE EAR
AND EUSTACHIAN TUBE.

2ND—RADICAL LABYRINTH EXENTERATION.

BY FRANCIS P. EMERSON, M. D.,

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The labyrinth, whether functionally disturbed or the seat of pathologic changes, has held in the immediate past and still continues to hold front rank in the interest of otologists. We are indebted particularly to the Vienna school for a classification of its diseases which is of great value in didactic teaching and as a pathologic grouping of its disorders. This must of necessity apply largely to typical cases. The otologist is more anxious about those cases less sharply defined clinically—cases which, in their final analysis, confirmed by operation, may be readily labeled pathologically, and yet in their clinical manifestations have presented a reasonable doubt as to the surgeon's attitude in regard to immediate operative interference. The relation of the vestibular apparatus to the brain demands an exact diagnosis and immediate surgical intervention in all pyogenic invasions of the labyrinth, if we are to save life. Under the above conditions the mortality rate is encouraging. The case outlined below is offered as one with delayed symptoms, and one which was perhaps less clear clinically than many.

The following history, taken from the records of the Massachusetts Charitable Eye and Ear Infirmary, occurred during the service of Dr. Crockett and Dr. Mosher, August 11, 1913:

J. L., American; occupation, florist; age, sixty-two years. Diagnosis, right ear, otitis media suppurativa chronica.

History.—The right ear had its onset with loss of hearing nearly thirty-five years ago, and was followed by ringing in the ears for thirty years. His present attack commenced

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about five weeks ago with moderate pain. Three weeks ago he had dizziness on movement, especially of the head forward and backward. The patient awoke at night with dizziness; vomiting and nausea were associated with the dizzy attack. Once, about a week ago, the patient had an attack of vertigo on stooping to lace his shoe. Failing of vision was noticeable, especially in the left eye, since injury and incision of the left part of the forehead years ago. There were no true chills, and no true headaches. He had pneumonia for three days (?) twelve years ago. The patient denies any discharge from the ear.

Left ear.—Slight deafness after slight pain and discharge for a brief period subsequent to la grippe four years ago. No night sweats; measles at fourteen years of age; tobacco, chews and smokes slightly; alcohol, very slight; venereal disease denied; two miscarriages by wife on second and third pregnancies; first and fourth children alive and well.

Physical examination.—Heart, left border three-fourths millimeter outside nipple line, otherwise all right. Urine negative.

Local.—Right ear: Slight preauricular, posterior and auricular tenderness. Canal near annulus is slightly reddened. Membrana tympani is absent; no ossicles are visible; granulations in posterior quadrant of middle ear; no bare bone felt on probing; cholesteatoma present; no mastoid tenderness or edema.

Left ear: Effusive otitis media suppurativa. Membrana tympani thickened, retracted and moderately calcified. The nose has a large cartilage perforation with history of trauma. Nasopharynx, etc., negative; right inguinal hernia in canal only, the size of an egg. Glands, epitrochlear and posterior cervical present. Hearing test.—

R	W	L
0	V	1/35
0	AC25"	6
— F 512 v. s.	BC12"	3
3	Weber < F 256 v. s.	
2.5	Limits Galton	N
0 v. s.	Low	v. s. .64

August 12.—Operation under ether by Dr. Emerson.

Right ear: Usual (slightly long) mastoid incision; sinus

exposed on removal of the first piece of cortex. Area of dura uncovered the size of a bean. This area was just over the antrum; more dura exposed, the cortex being paper thin, and the dura was probably that over the cerebrum rather than that over the sinus. There was a dehiscence in the superior wall of the canal anteriorly, so that the dura could be felt. The dura exposed over the attic and aditus, middle ear cleaned out, eustachian tube curetted; eight silkworm gut sutures to the mastoid wound; slight twitching of facial nerve on probing the middle ear; bridge just broken through; wick to middle ear and canal; dry dressing, pads and bandage.

August 17th.—Discharge from the middle ear is moderate; posterior auricular wound looks all right.

August 22nd.—Mastoid wound almost completely healed, middle ear moderately moist.

August 30th.—Wound completely healed, middle ear slightly moist. Patient has no dizziness on bending head back.

September 4th.—Middle ear slightly moist; wound healed.

September 8th.—Middle ear slightly moist.

September 10th.—Discharged, relieved, to out patient department. Hearing test.—

R	—————	L
0	W	6/12/35
	V	
0	AC25"	6
— F 512 v. s.		
3	BC12"	3
	Weber < F 256 v. s.	
0	Limits Galton	N
0 v. s.	Low	v. s. .96

Reentry November 11, 1913.—The previous operation relieved the symptoms until about one week after leaving the hospital, now about eleven weeks ago. Then the patient began to have dizziness and a sensation of whirling to the right on turning the head backwards, and to the right or backward, worse when lying down, noticeable on rolling over on the right side. Patient has fallen in the street five or six times in the past few weeks. He does not lose consciousness, and has had no nausea or vomiting in recent attacks, save twice, which he attributed to a sour salad.

Physical examination.—Negative, save loss of convergence of the left eye, in which the sight has been poor for more than

forty years, following an injury in the left frontal region. No nystagmus; fistula and caloric tests negative. On turning, symptoms of irritation when one of the vertical canals are in the plane of rotation. Healed mastoid incision, slight depression.

November 12th.—Dizzy spell; the patient came near falling from turning the head suddenly.

November 19th.—Fell to right side while coming out of the toilet into the hall, and fell forward after reaching a chair on attempting to rise.

November 28th.—Patient had a dizzy spell last night and fell.

December 4th.—Had a dizzy spell and fell at bedside at 11 a. m.

December 26th.—Had a dizzy spell and fell to the floor at 7:30 a. m.

December 30th.—Fell during early morning. While in bed the patient holds on to the iron rods of the head of the bed with both hands to prevent being lifted up and dropping out of the window. This sensation of rising toward the ceiling was very strong and constantly present, although his sensorium was clear.

January 9th.—Right labyrinth exenteration under ether, by Dr. Emerson. An incision was made through the old scar, which was very faint. There was free bleeding from the dura on freeing the soft parts, which was controlled by a plug. The mastoid area was very narrow. The bridge was taken down, which exposed the dura of the tegmen tympani and reached within one-fourth inch of the facial canal in the middle ear. Here the facial nerve was large and was exposed, and the sinus was bared posteriorly and the labyrinth approached from this, after the manner of Neuman. The horizontal canal was entered first. The space between the horizontal canal and the dura posteriorly was very narrow. The vestibule was entered through the solid angle and the superior and posterior canals followed out from the vestibule. The horizontal canal was clear, the posterior and the superior niches were demonstrated. The facial nerve lay down on the promontory and oval window so far as to make probing of the oval window dangerous. A flap in the canal was cut superiorly and posteriorly, letting the flap fall down and backward. A

light middle ear pack, a wick to the vestibule, a light cavity pack of iodoform gauze, silk worm gut sutures, dry dressing and bandage were used. (When the operation was complete the whole of the inner mastoid wall and tegmen, and the posterior surface of the petrous portion of the temporal bone down to the inner limit of the canals were removed. The superior and posterior canals lay so close to the surface that they could not be dissected with removal of the labyrinth shell.)

January 10th.—Rotatory nystagmus to left, patient very comfortable.

January 11th.—A moderate amount of clear discharge came from the cavity, of cerebrospinal fluid. (?)

January 15th.—Patient complains of a slight headache. The packing was removed and the cavity found clean. Repacked lightly with iodoform gauze.

January 16th.—Packing changed, patient feels well, bandage discontinued.

January 17th.—Packing changed, cavity clean.

January 19th.—A small wick was put in labyrinth cavity, outer cavity free.

January 24th.—Granulations not very active, cavity clean, discharge slight.

January 29th.—Discharge slight, dura cleaning.

February 8th.—Discharge very slight, epidermis spreading fast.

February 12th.—Labyrinth space filling in with granulations.

February 19th.—Labyrinth about closed in, granulations not overactive, middle ear cavity narrowed by granulations over facial, but epidermatized. Feels well. Discharged, relieved, to out patient department.

Urine negative. Nasopharynx, large perforation of the septum—traumatic. Wassermann reaction negative. (Blood test.)

Summary.—Previous to operation we have a man prematurely old. There is a perforation of the septum. His wife has had two miscarriages. The hearing test for his good ear—that is, the left—the writer has found to be strongly suggestive in other cases of lues—i. e., a low note, but little, if any, raised; a positive Rinné with marked lowering of bone

conduction, and the whispered voice reduced to one-twenty-fifth or one-thirty-fifth. In this case there was a negative Wassermann, but no examination was made of the cerebro-spinal fluid. His eyes and a physical examination did not give evidence of specific disease. Could lues then be eliminated as a direct or contributory factor in this patient's symptoms?

Second.—The right ear gave a history of discharge for thirty years, and in addition we have a cholesteatoma, which, as we know, is quite apt to invade the labyrinth. There were granulations in the posterior quadrant. The hearing test, done several times, always showed vestibular irritation when the vertical canals were in the plane of rotation. Unfortunately the difference in the after-nystagmus between the turning to the right or to the left was not recorded. The fistula and caloric tests were negative, and there was no nystagmus. The hearing test, done by two different observers, showed total deafness for the right ear, except a bone conduction of three inches. Can we say that this then was a case of diffuse purulent latent labyrinthitis, and that the apparent vestibular reaction was compensatory? According to Ruttin, this does not occur unless a latent purulent labyrinthitis has existed for a long time and has been followed by a complete ossification of the labyrinth or sequestration. In this case there was no clinical history of vertigo until five weeks before admission, and our operative findings showed the horizontal canal free, while the superior and posterior contained a grayish red, granular, nonadherent detritus. There was no organized tissue or evidence of ossification present. The second day after operation we have a clear serous discharge resembling cerebro-spinal fluid. There was no facial paralysis and no sequestrum was found. On the other hand, the turning test was always positive.

Third.—Have we any evidence to suggest that this was a case of diffuse serous secondary labyrinthitis? The onset of the vertigo favors this supposition, and is confirmed by the hearing test, which shows a remnant of vestibular irritation present. The operative findings are also consistent with this diagnosis. On the other hand, the caloric and fistula tests were negative, and there was no nystagmus at the time the patient was examined. The caloric reaction we know may be

lost. If we assume that the portal of entry was originally by way of the oval window, could we not explain the failure at this time to obtain a positive fistula test by the presence of granulations in the posterior quadrant of the middle ear? We recognize that such an invasion is more often followed by a purulent labyrinthitis, but three cases out of fifty reported by Ruttin were followed by the serous form. There remains then to be accounted for the absence of nystagmus. This is a symptom of irritation, and if of the second degree it might readily have been wanting at the time of observation. In the light of our symptomatology and the operative findings, the writer is inclined to consider the case one of a diffuse serous secondary labyrinthitis as affording the only consistent diagnosis. For those who accept this interpretation the division into two stages of the operative procedure is perfectly consistent. If this diagnosis is accepted we must assume that there were no well defined symptoms immediately following the mastoid operation, but that, if present at all, they were but little marked, and only developed as a pronounced diffuse serous secondary labyrinthitis on the sixth or seventh day.

LXII.

THE USE OF QUININ AND UREA HYDROCHLORID AS A LOCAL ANESTHETIC IN ONE HUNDRED AND FORTY-EIGHT CASES OF TONSILLECTOMY.

BY LOUIS J. BURNS, M. D.,

PHILADELPHIA.

In considering the use of the double salt of quinin and urea hydrochlorid as a local anesthetic in the operation of tonsillectomy, I shall endeavor to confine myself to such advantages which it seems to possess over other anesthetic agents, such as cocain, novocain, etc., now in use by the laryngologist, namely, mode of action, duration of anesthesia, method of application, and primary and secondary hemorrhage, eliminating entirely discussion of the various operative technic now in use, it being influenced apparently in no way by any other technic than that in which it was employed.

Before considering its application directly, a short résumé of quinin and its various combinations, and its early use as an anesthetic, may give a better insight to its various fields of usefulness as a local anesthetic.

The first use of quinin and urea as an anesthetic was called to our attention September, 1907, by Dr. Henry Thibault, Scots, Arkansas, he first having employed one to two per cent solution in general surgical procedure, such as incising of furuncles, carbuncles, removal of cysts, etc.

Ten to twenty per cent solutions were also used to the mucous membrane in pharyngitis, tonsillitis and in rectal conditions. Although Thibault first called attention to the action of the double salt of quinin and urea, the action of quinin itself had been generally observed in our Southern states, where large amounts of quinin sulphat have been used hypodermically, that the injected and surrounding areas remained anesthetic for a long time afterwards, thus facilitating the use of the injected areas for further injections.

August, 1908, Dr. Edward J. Brown, Minneapolis, suggested the use of quinin alone, after first painting the tonsil and surrounding tissues with holocain, and following this with an injection of three per cent solution of quinin hydrochlorid with adrenalin.

This method has proven unsatisfactory, as the rapid hemostatic action of adrenalin precluded the production of sufficient action of the quinin to produce the necessary anesthesia. This was likewise proven a rather dangerous procedure, inasmuch as there was the ever-present danger of secondary hemorrhage following the relaxation of the blood vessel walls upon the subsiding of the hemostatic action of the adrenalin.

October, 1909, Dr. Arthur E. Hertzler, University of Kansas, suggested the use of quinin and urea hydrochlorid as a local anesthetic in surgical operations such as hernia, tumors and rectal operations.

Parsons of London experimented with its use in cases of uterine prolapse, by producing marked infiltration, but later abandoned its use, finding it impossible to properly gauge the amount of infiltration its use in softer structures would produce, it having a tendency to overdistend the more pliable abdominal and perineal tissues.

As to the strength and amount of solution, and time necessary to produce anesthesia: These were points in its use which only a great number of cases were able to satisfactorily demonstrate. About three minims at each of our five points of injection are usually sufficient, more than this amount causing an overdistention in our field of operation.

As to the strength of solution: The stronger solutions to ten per cent were first employed, but finally abandoned, it being found that an excess of exudate was produced, which condition interfered with our operative technic, later causing very uncomfortable symptoms, such as pronounced swelling and a very disagreeable fullness of the injected and surrounding areas.

One-half of one per cent solution was also used, but this failed to produce anesthesia, as likewise the necessary infiltration to prevent pronounced primary or the occurrence of secondary hemorrhage, which feature is one of the greatest advantages of its use.

Two per cent solution was finally selected as the strength

best suited for use, giving pronounced anesthesia and sufficient infiltration as a postoperative precaution against secondary hemorrhage and pain, at the same time not interfering in any way with our operative technic, or separating the tonsillar capsule from its attachments, or later application of the snare, if such instrument is employed.

The quantity of solution necessary is of great importance; in fact, its whole success depends on the use of only a sufficient amount to cause a pronounced infiltration without an overdistention of the surrounding areas. Thirty to forty minims are usually sufficient, for inasmuch as it requires five to six minutes for our infiltration to reach a sufficient degree to produce marked anesthesia, we can very readily understand that by the time our anesthetic has taken effect, our field of operation will be so distended that our operative technic will be greatly interfered with. It is, therefore, advisable to avoid an excessive amount.

As to the point of application and technic of injection: Four to five points on either side are sufficient. Low down on the anterior pillar, one about midway between that and the supra-tonsillar fossa, one at the fossa and two in the posterior pillar. Extreme care should be used not to overdistend our posterior pillar, as an excess of infiltration may cause a considerable amount of discomfort by later on forcing its way into the loose tissues of the soft palate, or into the uvula itself, or downward to the glottis, producing a feeling of distention or fullness in swallowing or attempt at speaking.

About three minims to each point of injection is all that is ordinarily required; and as it is not an uncommon thing for the point of our needle to penetrate through both surfaces of the tonsillar pillar, instead of merely restricting itself to the confines of the adjacent pillar walls, it is advisable to fill our syringe to avoid the necessity of stopping to refill. But inasmuch as our drug is absolutely nontoxic, no alarming symptoms are caused if any is accidentally swallowed, although this seldom occurs, as our patients very promptly appeal to us to permit them to expectorate, due to the pronounced bitter quinin taste.

A point in the technic of our injection to be carefully observed is our tendency to insert the second injection before we have waited until we have noticed the extent of the pre-

vious one, as a looseness of the tissue in the injected area is an index to the point for our next injection, infiltration sometimes extending for over one inch from as much as five minims of fluid.

It is best, therefore, to wait for the previous injection to reach its maximum of infiltration before repeating our next. This should be especially observed in our injection downward or upward in the posterior pillars.

Of its mode of action: Early experiments first led to the belief that the edema and thickening produced in the injected areas was due to cellular infiltration. This was later proven to be not a cellular but a pure fibrinous induration, free from cells, proving that the induration is purely a chemic change.

As to the degree of anesthesia produced: The incised tissues are completely anesthetized, no pain being produced by such operative procedures as pulling the tonsil forward from its attachment or in the separation of adhesions low down. The latter might be avoided were it not for the disagreeable effect produced by the infiltration if injected too near the base of the tongue.

Of the time necessary to produce anesthesia: It is found to be present within three or four minutes after injection, at which time it seems most desirable to operate, delay not being advisable beyond ten minutes.

Considering duration of anesthesia: It usually lasts five to seven hours, gradually subsiding for a period of three or four days. This feature is one of its greatest advantages, obviating, as it does, many of the disagreeable postoperative symptoms so common in tonsillectomy. The only annoying feeling at any moment produced is a fullness on swallowing, with occasional pains radiating to the region of the ears. This feeling of fullness is produced by infiltration of the quinin and urea. In many cases marked distention of the uvula takes place, this edema being caused by the infiltration producing a mechanic obstruction to the circulation in this region.

As to the technic of application: The only instruments necessary are an ordinary hypodermic syringe with the addition of an extra barrel about three inches long, which screws on the same thread as an ordinary hypo needle, this being necessary to give us additional length needed to reach our field of injection, namely, the anterior and posterior pillars. At the

distal end of the additional barrel is screwed on an especially constructed reinforced needle with a partly flexible barrel extending up to the steel point of the needle proper, which is curved to permit of its insertion into the folds of the anterior and posterior pillars. This needle is further protected by a small shoulder at the junction of the needle proper and the partly flexible barrel, to prevent its sudden plunging into deeper structures than the pillars and the tonsil structure itself. Or an all metal syringe, such as used in the more recent cases, with three ring attachments, to enable us to more readily control our technic in injecting.

Up to the present time I have used it in one hundred and forty-eight cases of tonsillectomy, irrespective of the condition of the tonsils, whether characterized by marked adhesions, freely detached or diseased. In other words, I have depended entirely upon its use as a local anesthetic in tonsillectomy where local anesthesia might be employed; it of course being applicable only to such cases as we would ordinarily select for local anesthesia.

In fact, its use has proven applicable to very many cases in which we would refrain from the use of cocain, either locally or by injection, in sufficient strength to give us either an equivalent or necessary anesthesia. Its absolute nontoxic action permits its indiscriminate use in the neurotic or chlorotic individual, so often the subject of tonsillectomy. I have not encountered a single case of the ever-prevalent and disagreeable phenomena which heretofore have been some of the few drawbacks with which the laryngologist has been compelled to deal, where cocain and such other toxic anesthetics have been employed.

Observations taken in one hundred and twenty cases fail to show any marked changes in either the force or frequency of the pulse before, during or after operation. Never at any time has any case shown any of the ever-prevalent symptoms of collapse or the so-called fainting which has always heretofore been one of the objectionable features of tonsillectomy where local anesthetics such as cocain, etc., have been used; eliminating, of course, the temporary excitement which might occur, due to our operative technic, etc.

Fifty-nine cases out of a total of one hundred and forty-eight were inmates of the Pennsylvania Training School for

Feeble Minded and Epileptic, its use at this institution being limited, however, to only the higher grade inmates. This class of cases furnished us with a strong index of its value, inasmuch as patients of this type are difficult to thoroughly anesthetize, and likewise very prone to profuse primary and secondary hemorrhage. They also have a tendency to the idiosyncrasies of cocain, eucaïn, and their derivatives, being strongly inclined to collapse with even the use of the weaker solutions.

One patient, a young woman, twenty-eight years of age, with a history of profuse postpartum hemorrhage at the birth of each of her four children, in whom had occurred severe hemorrhage on previous operations for nasal polypi and sinus disease, was operated upon for tonsillectomy. She stated she suffered from no pain, and she experienced no primary or secondary hemorrhage. This was one case in which I hesitated for some time to administer a general anesthetic or any other local application or injection until quinin and urea had finally convinced me of its perfect safety. This case was demonstrated before the Laryngological Section of the College of Physicians of Philadelphia, three and one-half hours after operation, she up to that time and afterwards having experienced no unpleasant symptoms or secondary hemorrhage, though she was compelled to travel the distance of three miles to and from the place of meeting. Adrenalin chlorid in one to one-thousand solution had little or no effect in her previous nasal operations. Packing snugly applied was always necessary.

Another very noticeable advantage, and probably one of its pronounced ones, is the absence of hemorrhage, either primary or secondary; but one case of primary hemorrhage occurred, and that in a young man of eighteen years of age, whom it was afterwards found had a low coagulation. This hemorrhage was very readily controlled by pressure, the patient returning to his home unassisted in about one hour's time, having no further trouble. No case of secondary hemorrhage occurred.

This lack of hemorrhage is due to the action of the injection, producing a fibrinous induration in the tissue surrounding the blood vessel different from the action of cocain and adrenalin, which acts upon the vessel walls, in that the pressure upon them is from without. Inasmuch as the induration lasts many

days, with a tendency to increase somewhat within the first one and one-half hours, gradually subsiding for several days, we can readily appreciate its marked advantages over cocain and adrenalin, both of which are inclined to be very unstable in their hemostatic action, subjecting our patient to the ever-present danger of either primary or secondary hemorrhage. The prolonged presence of this infiltration likewise permits our healing process by granulation to become well advanced, thus avoiding to a great extent the possibility of adhesion between the anterior and posterior pillars, owing to the gradual subsiding of our infiltrations drawing our tonsillar pillars apart.

In conclusion, as to its value purely as an anesthetic: It has proven a most reliable one, always producing sufficient anesthesia, is rapid in action, and sufficiently permanent to proceed with operation without being compelled to interrupt our technic to make further application. The great majority of patients operated upon freely expressed themselves as suffering from no pain whatever other than the always prevalent tendency to swallow during operation, which fact is a question of the patient and not the anesthetic.

In conclusion, its use has proven the following advantages:

1. Its absolute nontoxicity in even as strong solutions as ten per cent.
2. Always produces sufficient anesthesia to complete our operation without the necessity of stopping to make further application or injection.
3. Marked diminution of after-pain and discomfort.
4. Its superior advantages over cocain and its derivatives, due to its nonsystemic action.
5. Absolute absence of troublesome primary or secondary hemorrhage; this being one of the frequent and dangerous drawbacks, especially in the type of cases so often the subject of tonsillectomy by local anesthetic.
6. The readiness with which our solution may be sterilized; frequently repeated high temperatures producing no chemic or physiologic change.

LXIII.

THE MASTOID OPERATION DEPENDENT UPON PATHOLOGY.*

BY CULLEN F. WELTY, M. D.,

SAN FRANCISCO.

For some thirty years or more the duration of a discharging ear put it in one group or another in regard to operative procedure.

In this paper I wish to deal with children under fifteen years of age with discharging ears that have lasted one year or more. This one year period was established long ago by surgeons more eminent than myself.

I wish to show by a series of operated cases that a radical mastoid should not be done as a routine procedure, as many of the cases will recover by the simple operation. In other words, the pathologic findings before and during operation should determine the kind of operation to be done.

The contraindications to the acute mastoid operation in chronic suppurative otitis media in children under fifteen years of age may be divided into two groups—those that may be present prior to operation, and those that are found during the operative procedure.

All cases of proven tuberculosis of the ear should be excluded.

Group 1.—(a) Acute exacerbation of the chronic suppuration associated with cerebral symptoms.

(b) Vertigo, nausea, vomiting, nystagmus or facial paralysis.

(c) Acute or chronic labyrinthitis, or destruction of the labyrinth, fistulæ of the labyrinth, cases that react to the fistulæ symptom, also partial or complete destruction of the tympanic wall, true cholesteatoma.

*Read before the Pacific Coast Oto-Ophthalmological Society, June 15, 16 and 17, 1915, San Francisco, California.

- Group 2.—(a) Cholesteatoma.
 (b) Fistulæ of the semicircular canals.
 (c) Such extensive bone disease of the walls of the attic and antrum that it cannot be removed with certainty.

This paper is based upon twelve cases in which the double mastoid operation was performed. Two of the cases were acute exacerbations of the chronic suppuration. All but one recovered from the discharge.

This particular case was well for some months, returning with a fistula through the bony attic wall. This was not seen prior to operation because it was one of the cases of acute exacerbation with the meatus almost closed.

I do not understand why it was not seen in the after-treatment. My only explanation is that it was mistaken for the perforation of the drum membrane and was finally healed completely.

As I said before, this case returned with a discharge and granulations coming from this perforation, low down on the tympanic wall. There must have been a slow carious process going on within the tympanic cavity. However, this never gave any distress. Reoperation will be required.

Schwartz's operation was originally performed for both acute and chronic cases. Some of the chronic cases did not recover, and at this time Stacke described an operation that was to cure the chronic cases particularly. This held for some time, or, rather, divided the honors with the Schwartz operation.

Neither of them was satisfactory until Zaufal combined the two operations, calling it the radical mastoid operation—used only in chronic suppurative otitis media, while the Schwartz method became the accepted procedure for the acute process.

The Stacke operation is done at the present time only when the sinus is so far forward that no other operation is possible.

In 1904 Jansen was doing an operation in chronic suppurative cases that never became popular enough to have a name. In this procedure he took most of the posterior wall down, but did not disturb the annulus tympanicus. He also took away as much of the attic wall as was possible in a given case, leaving the ossicles in place, so that they could be seen during or at the completion of the operation. He did not disturb the posterior membranous meatus. The case from this on was

treated as we treat our acute mastoid operations of today. This procedure was not entirely satisfactory and it was abandoned.

Some time after this, Heath of London introduced a universal operation for acute and chronic cases. This consisted in cutting down the posterior wall to the annulus tympanicus, destroying all the mastoid cells, cutting the posterior membranous canal and pushing it into this newly made cavity. The outer wound was closed; further treatment was through this posterior hole in the meatal wall.

This procedure is not entirely satisfactory in the hands of all men. In fact, no one operative procedure will be good in all cases.

With the array of facts as I have presented them, you can see why I have gone to the Schwartze operation in only selected cases.

I maintain that by going down to hard bone over your entire cavity, in cases such as I have selected, the hearing will be as good, or more than likely better than it was before the operation. Also, the after-care of the ear will be eliminated, and that will be a great factor.

Furthermore, if the case does not entirely recover, the radical mastoid may be performed.

LXIV.

A CASE OF ENDOTHELIOMA OF THE TRACHEA.

BY CHARLES GOODMAN, M. D.,

NEW YORK.

In 1906 Theisen collected eighteen cases of primary tracheal sarcoma and twenty-four cases of carcinoma of the trachea. Since Theisen's paper there have been six cases of malignant tracheal tumor by Berens, Kaunitz, Simmell, Eidenheim, and Najer, to which may be added that of Heymann, which was histologically similar to the Henrici case, described in Keen's Surgery, Vol. III, p. 497, as an "elongated roller shaped tumor occupying the posterior wall and attached by a broad base, and histologically resembling the salivary gland tumors (endotheliomata)."

Heymann's case was a man of thirty-two years, with a tumor somewhat more than the size of a bean, situated just above the opening into the right bronchus. The tumor was extirpated in two sittings, with the Brünning forceps, but there was a relapse, and Professor Gluck then severed the trachea immediately under the cricoid cartilage in the crico-tracheal ligament, retaining at most one or two tracheal rings. The epithelium over the tumor was pavement epithelium, so, according to Borst's definition, it was classed as an endothelioma.

As far as I have been able to see from the literature, there are thus only two cases of endothelioma of the trachea which have been reported. In view of the rarity of such cases, one recently operated upon by the writer is doubly interesting, as an operative technic seldom practiced was carried out. The technic is suggested on page 498, Keen's Surgery, Vol. III.

CASE HISTORY.

S. F., aged twenty-one years, tailor. Admitted on April 12, 1915, to the hospital. He had had the usual childhood dis-

eases. When fourteen years of age he had had tracheotomy performed for threatened asphyxia during diphtheria. Following this operation he was perfectly well for five years, until 1912, when he consulted Dr. W. Freudenthal for dyspnea, which had gradually been growing worse for the past two months. Examination at that time disclosed a normal condition of the upper air tract, while below the glottis a crescentic mass with the concavity forward could be outlined.

An attempt was made to remove this diaphragm-like mass under local anesthesia by direct tracheoscopy. The patient did not tolerate the manipulation, and further efforts were postponed for ten days. He was then anesthetized and the tracheoscope was introduced. Asphyxia ensued, requiring immediate tracheotomy. Ten days later several granulation masses were removed through the tracheotomy wound (December, 1912). The patient was relieved for a short time only, when dyspnea again set in. November 8, 1914, an examination revealed a reddish mass in the trachea, extending apparently over the greater part of the circumference, just below the cricoid cartilage. On November 14th, rectal anesthesia was administered, and a removal of this mass through the tracheoscope was attempted. Severe hemorrhage set in, necessitating the interruption of further operative procedure. One week later tracheotomy was performed under general anesthesia, exposing the neoplasm. Its removal was accompanied by a moderate amount of bleeding. This case was presented before the Section on Laryngology of the Academy of Medicine, February 24, 1915.

Although radium had also been introduced into the trachea, there was a rapid recurrence of the growth. The patient first came to the notice of the writer in April, 1915.

Physical Examination.—Scar at median line of the neck at site of the previous operation. The patient denied venereal disease, and the Wassermann reaction was negative.

Operation, April 14, 1915 (Drs. Goodman and Freudenthal).—A tube was introduced into the trachea by way of the mouth, and intratracheal anesthesia was administered by Dr. Ehrlich. A median incision exposed the trachea. The trachea was then mobilized. This was found extremely difficult on account of dense adhesions as the result of previous

operation. After the trachea was freed from its surroundings it was opened, revealing a soft, irregular, nonpedunculated tumor situated on the right wall of the trachea, one ring below the cricoid cartilage and extending over an area of two tracheal rings. These two rings were resected, leaving the posterior membranous wall in front of the esophagus. With chromic gut sutures the two severed ends of the trachea were approximated. A low opening was then made in the trachea below the line of suture and a tracheotomy tube inserted. Small gauze drains were inserted on either side of the trachea. The remainder of the wound was sutured and a dry dressing applied. The tube was removed on the fourth day and the wound allowed to close by granulation.

With the exception of steam inhalation, no special post-operative treatment was required. The patient had an uninterrupted convalescence. The attacks of dyspnea have not returned up to the present time.

PATHOLOGIC REPORT.

Dr. Alexander Fraser of New York University said that the tumor presents all the characteristics of those forms classified as endothelioma. On the other hand, Dr. MacCallum and Dr. Pappenheimer agree with Dr. Lambert, that endotheliomata do not occur except in the meninges. Dr. MacCallum is inclined to regard the tumor as of probable epithelial origin.

We feel justified, however, in retaining the Borst and Henrici definition, approved by Keen, and more recently by Heymann, as well as by Dr. Eli Moschowitz of the Beth Israel Hospital, in the first pathologic report of this case.

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LXV.

TEMPOROSPHENOIDAL ABSCESS WITH UNUSUAL
COMPLICATIONS.*

BY JOHN LESHURE, M. D.,

NEW YORK.

The patient, Mrs. T., aged fifty-two years, first consulted me October 31, 1912, stating that she had been treated about two months for a boil in her right ear. Her previous history was negative, save for occasional attacks of headache and intermittent discharge from the ear.

Physical Examination.—The patient was a stout, phlegmatic woman, apparently in good health aside from the ear affection.

Examination of the ear revealed a marked swelling of the meatal wall which completely occluded its lumen and rendered impossible a view of the fundus. The auricle and adjacent tissues were infiltrated and edematous, and just above the zygomatic process, at a point one inch anterior to the meatus, was a diffuse swelling which suggested a deep temporal abscess.

Palpation of this area was exquisitely painful to the patient, but there was no tenderness over the mastoid process at any point. The temperature was 99°; pulse, 78; respirations, 20.

The tuning forks were heard normally over the mastoid, and lateralized to the affected side. Air conduction was zero. There was no vertigo. The eyes and reflexes were normal.

A diagnosis of deep temporal abscess complicating a chronic suppurative otitis media was made and the patient sent to the hospital for operation.

The following day, November 1st, incision was made over the temporal swelling down to the periosteum, but only a small amount of pus was found. This was evacuated and a wet dressing applied.

*Read before the New York Academy of Medicine, Section on Otology, May 14, 1915.

The patient improved for the next few days, but on November 4th the temperature rose to 103.4° , the urine diminished in quantity and was found on examination to contain a large amount of albumin and numerous coarsely granular casts. The patient became drowsy and could be aroused only with difficulty.

Under appropriate treatment the condition cleared up, and at the end of a week she was sitting up and planning to go home. On November 11th the patient again became drowsy and complained of headache for the first time, but an examination of the urine showed only a trace of albumin and no casts. I then suspected an intracranial complication, either abscess or gumma, but no focal symptoms or signs could be elicited. On the following day, November 12th, I noticed that the right pupil was moderately dilated and reacted sluggishly to light. Examination of the fundus showed a slight haziness of the optic disc but no measurable elevation. The pulse, which had averaged up to this time around 72, dropped to 54; her temperature was 99.6° ; respirations, 24. There was no nausea or vomiting. Cheyne-Stokes respiration was well marked.

There was no paralysis, but the reflexes were slightly exaggerated, and one curious phenomenon was present which was of considerable interest. This was a rhythmic movement of the right arm (i. e., the arm on the affected side). The Babinski and Kernig signs were both absent. The symptoms were evidently those of intracranial pressure, and the diagnosis lay between cerebral abscess, probably in the temporal sphenoidal lobe, cerebral hemorrhage, and brain tumor (gumma or malignant growth). With the history of previous ear suppuration, the evidence was decidedly in favor of brain abscess. That evening at ten o'clock a radical mastoid operation was done, practically without anesthesia, as the patient was unconscious. The posterior meatal wall was taken down, and when the antrum was opened it was found that its roof and the roof of the attic were dehiscant and the exposed dura was covered with granulations. The temporal bone was removed for a distance of an inch, exposing the dura covering the temporal sphenoidal lobe. The dura was dark in color, and the presenting lobe did not pulsate. The dura was incised and a slender knife entered the abscess cavity at a depth of one-half

inch. About two ounces of thin, nonfetid yellowish pus were slowly evacuated, and the patient began to show signs of returning consciousness almost immediately—so much so that the anesthesia had to be resumed.

Particles of disintegrated brain tissue came away with the pus, which fact suggested that the condition was one of spreading encephalitis. Pulsation was immediately restored in the exposed lobe, and there was no evidence of meningeal infection. The patient was returned to bed in much better condition than before operation. Pulse, 120; temperature, 101.6°; respirations, 36.

On the following day, November 13th, she spoke rationally and took nourishment satisfactorily. She was given urotropin, grains eighty, p. d. Temperature, 102.4°; pulse, 108; respirations, 30.

November 14th complaint was made of severe headache, and there was some rigidity of the neck muscles. A lumbar puncture was made and about an ounce of turbid fluid withdrawn. This contained a large number of cellular elements and coagulated soon after standing. The predominating micro-organism was the pneumococcus. The lumbar puncture was followed by a considerable improvement in the symptoms, and the patient had a fairly comfortable night.

The next day at 8:30 a. m. the temperature was 102°; pulse, 130; respirations, 34; but as the meningeal symptoms increased in severity towards the afternoon, another lumbar puncture was made, withdrawing about one-half ounce of turbid fluid.

There was some improvement in the character of the pulse, but at six o'clock the temperature had risen to 104.8°, with pulse of 160 and respirations, 62. Particles of brain tissue were mixed with the wound secretion, which was thin and watery, suggesting rupture into the ventricle.

The Kernig sign was present and most marked upon the right side. The patient died four hours later. Unfortunately, permission for an autopsy could not be obtained.

Comment.—The case is of interest chiefly from a diagnostic standpoint, and the question arises as to how long the abscess had existed.

The patient impressed me as a rather stupid individual, and her replies to questions were often evasive; but her relatives had not noticed any particular change in her mental condition,

and there were no focal symptoms until the day of operation.

The results are apt to be more favorable when one can do a cerebral decompression, incising the dura, and waiting twenty-four hours, during which time the subarachnoid lymphatic space will become walled off and the probability of meningeal infection lessened. The support of the dura being thus withdrawn, the abscess is apt to evacuate itself or, at least, the pus will be found nearer the surface. In my case, however, no delay was permissible and the chance had to be taken.

Another question is whether the first attack of stupor was due solely to nephritis or partly to the beginning cerebral condition. I am inclined to think that it was entirely of uremic origin.

I have been unable to explain satisfactorily the predominance of the irritative symptoms (i. e., the Kernig sign and the rhythmic arm movements) on the affected side. A colleague stated that he had seen this phenomenon once before in a case of brain abscess, and explained it by a failure of the fibers to cross in the pyramidal tract. This case illustrates the danger of allowing a chronic middle ear suppuration to run on with imperfect drainage. If a radical operation had been done some months before, the patient's life might have been saved.

LXVI.

REPORT OF A CASE OF MULTIPLE ABSCESS OF
THE BRAIN—OPERATION—RECOVERY.*

BY JOHN GUTTMAN, M. D.,

NEW YORK.

Intracranial operations, especially for brain abscess following ear affections, are of comparatively rare occurrence. The report of a case presenting such a succession of events, especially when followed by recovery, is, in the writer's opinion, worthy of record.

Mrs. C. C., thirty-three years old, became sick September 13, 1914, with pain in the left ear. A few days later the drum membrane ruptured spontaneously. There was quite a copious flow of pus, and thereupon the subjective symptoms, as pain in the ear, headache, etc., subsided.

On November 8th, about seven weeks after the onset of the disease, I was called in and found the patient suffering very much, presenting all the symptoms of an acute mastoiditis and a possible intracranial complication. In addition to the objective symptoms, sagging of the upper wall of the ear canal, insufficient drainage of the purulent secretion of the cavum tympani, edematous swelling of the planum mastoideum, the patient complained of a very severe headache, nausea, sleeplessness, depression, and fever.

On November 9th I performed the usual mastoid operation. In the antrum there was only a small amount of pus, but a good deal of granulation tissue. The following two days the general condition of the patient improved very much. On the third day the temperature rose suddenly to 102°, with a pulse of 104. Excruciating headache localized on the left side. The following three days the temperature varied between 100° and 101°; pulse between 96 and 110. General malaise, nauseating

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feeling and (once) vomiting. There developed a slight drooping of left upper eyelid, a slight ptosis, a slowness of cerebation, and patient became somewhat irrational. Sensibility for touch and pain remained normal; the labyrinth reaction was normal, although the caloric test on the left ear showed a somewhat sluggish reaction. The eye grounds were normal; there was no Babinski, and no Kernig. As on November 11th, the frequency of the pulse became as low as 66, and an amnesic aphasia had developed (the patient could not name some of the most familiar objects or persons), it became apparent that we had to deal with a brain abscess or possibly only with an epidural abscess.

On November 14th the patient was again placed under ether, and after removal of the squama of the temporal bone the temporosphenoidal lobe was exposed. The dura appeared normal, pulsating without any sign of a diseased condition. Thereupon the dura was split and the brain explored in different directions with a grooved director. When the director was inserted anteriorly and downward, about one ounce of thin, nonsmelling pus was evacuated. The abscess cavity was inspected with the Whiting encephaloscope; no lining membrane was noticed. Thereupon the cavity was packed with iodoform gauze and the patient returned to bed. The following day the patient was much improved; the temperature and pulse were normal; headache diminished and cerebation improved, but the amnesic aphasia continued. The patient was bandaged daily.

Five days later the symptoms suddenly became grave again. The headache returned, the pulse became slow again, and the aphasia became more marked. The following day the patient was again placed under ether and the brain explored in different directions. When the director was thrust upward in a vertical direction, towards the cortex of the brain, about half an ounce of thin, grayish colored pus was evacuated. Thereupon the pulse immediately improved considerably, jumping from sixty to about one hundred and twenty before the patient left the operating table. No drainage in the wound of the second abscess, and only the outer wound was dressed. The following day there appeared a colorless pulsating liquid (cerebrospinal fluid) in the wound. On December 20th, when the wound was nearly completely healed, the patient left my med-

ical care. Her general condition, with the exception of some slight headache and slight remnant of the aphasia, was quite satisfactory. The fistula of the lateral ventricle was almost entirely closed. The mental condition was perfectly normal.

EPICRISIS.

According to Hammerschlag, brain abscess complicating chronic purulent otitis media is four times as frequent as brain abscess complicating acute purulent otitis media. According to Jansen's statistics, the relative frequency is one to six.

In the first operation for brain abscess, after exposure of the dura, there was no outward sign to indicate that in the depth of the brain substance there was pus. There was no outspoken hyperemia of the dura, no bulging—nothing but normal pulsation of the brain substance. It was very tempting to terminate the operation right then and there, and postpone the exploration of the brain for a later period, in the expectation that the symptoms might recede. The history shows that the clinical symptoms are more to be relied upon than the outward appearance of the brain cortex.

The evacuation of the second abscess cavity after the opening of the first abscess cavity seemed to have cleared up the whole process. There is no way of determining whether the second abscess was or was not in some connection with the first abscess; the second abscess might have been only an offshoot of the first abscess, so that the two formed a sort of a dumbbell shaped abscess; much more probably the second abscess was independent of and separate from the first one, as may be inferred from the following considerations: the second abscess was located in an entirely different direction from the first one, viz., straight upward and subcortically; and secondly, the encephaloscope disclosed no communication between the two abscess cavities.

The fistula of the lateral ventricle did not seem to have any serious consequences, for toward the end it nearly closed completely by itself. The recovery of the patient is undoubtedly to a great extent to be ascribed to the early operation before any severe destructive process of the brain tissue took place.

LXVII.

THE BACTERIOLOGY OF ACUTE OTITIS MEDIA
AND MASTOIDITIS AND THEIR COMPLI-
CATIONS—BLOOD CULTURES.*

BY JAMES GARFIELD DWYER, M. A., M. D.,

NEW YORK.

During the last few years, more and more attention has been paid to the bacteriology of acute otitis media, mastoiditis and their complications, and as the writer has had an opportunity to examine and identify the organisms from a series of these cases, it was thought that it might be of interest to this section to report on the findings and to emphasize some of the points that seemed to be of importance.

It is our rule at the Manhattan Eye, Ear and Throat Hospital to take cultures from the mastoid cavity at the time of operation and to identify these organisms culturally and morphologically. It is usual, also, to take cultures from the auditory canal preceding operation. An analysis of the organisms found in acute and subacute mastoiditis follows. No reference is made to the organisms isolated in chronic otitis media, or those found when the radical mastoid operation is performed.

Analyzing a series of one hundred and seventy-four cases, taken in routine work from the mastoid cavity, we found that the streptococcus hemolyticus was present in about sixty-five per cent; the streptococcus viridans in five per cent; streptococcus mucosus capsulatus in twenty per cent; staphylococcus pyogenes aureus in eight per cent, and the balance comprised infections with bacillus mucosus capsulatus, bacillus pyocyaneus, pneumococcus and bacillus diphtheroid. One point is worthy of note, the fact that two organisms were isolated in ten cases: Staphylococcus pyogenes aureus with pneumococ-

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cus; streptococcus hemolyticus with bacillus pyocyaneus; staphylococcus pyogenes aureus with streptococcus; staphylococcus pyogenes aureus with pyocyaneus; streptococcus mucosus with pyocyaneus; streptococcus mucosus with bacillus mucosus; and finally, streptococcus hemolyticus with bacillus diphtheriæ.

Thus the relative importance of the organisms can be seen—the very small number of infections with pneumococcus, the relatively large number with streptococcus mucosus, and the presence of others of very low pathogenic power. The statistics of the organisms found in cultures from the auditory canal in the ordinary otitis media cases, irrespective of whether the case progressed further to mastoiditis, are unsatisfactory, and the reports unreliable, as errors in technic play a very important part in the isolation of the causal organism. In other words, there is often no relationship between the organism found in the canal of the ear and that from the mastoid. The reason for this statement is the fact that in nearly all of the above cases of mastoiditis a preliminary culture had been taken from the canal of the ear, and it is very important to emphasize the fact that unless the greatest care is exercised in taking such cultures the findings are unreliable. Time and again the cultures taken in a routine way from the canal of the ear showed the various strains of staphylococci, when at operation the other organisms were found and no staphylococci were demonstrated. This is due to faulty technic, as the staphylococci have their natural habitat in the auditory canal, and unless the cultures are carefully taken from the secretion in the middle ear—that is, taken through the perforation in the membrane through a sterilized auditory canal—the results are not reliable, as the staphylococci easily outgrow the ordinary pathogenic organisms of more delicate growth. One thing that was worthy of note was the fact that many infections with the streptococcus mucosus capsulatus did not go on to mastoid involvement and cleared up in the usual way.

The next important point that we wish to make is the question of bacteremia and the importance of blood cultures. Blood cultures have come to be one of the most important and useful means at our disposal for diagnosis. We need only refer to their importance in typhoid fever and pneumonia, as an example of what may be done by their aid. Blood cultures

have a special interest for the otologist, as in his province the source of infection of the blood stream is easily accessible to surgical interference as contrasted with infections in other parts of the system, such as infection of the uterine veins in puerperal infections. Moreover, blood cultures represent exact scientific methods of procedure, and it may mean the saving of days in the clearing up of the diagnosis, and may save a useless and unnecessary exploratory operation.

The great question for us to consider is the relationship of bacteremia to the infection. Do bacteria or can bacteria enter the blood stream in every case of local infection? They can and very often they do, and even the smallest focus may be the cause of a bacteremia. So that a bacteremia per se does not necessarily mean a fatal prognosis. In a short review of the literature on this subject we might remember that in perfectly healthy men organisms have been isolated from the blood: that muscle tissue removed from healthy animals under the strictest aseptic precautions has been shown to contain many of the ordinary pyogenic organisms. Hence, bacteremia must be considered in conjunction with other factors. Again, we must remember that the blood can rid itself of bacteria after infection, without any surgical aid, and in most cases does so. Again, we must differentiate between a simple carrying of the organisms in the blood and a condition in which the organisms are multiplying in the blood. There is no doubt but it is incapable of proof that thrombosis is present in a very large proportion of cases in which its presence is not even thought of. We are all familiar with cases in which we have found a thrombosed sinus at operation and which we leave alone and have recovery. It has already been walled off.

What is the significance of a negative blood culture? A bacteremia may be present and yet the blood culture be repeatedly negative. There are always several factors to be kept in mind in all blood culture work. Among these are the mechanical factors favoring a negative blood culture. There may be only a few bacteria present, and in the few cubic centimeters that are drawn you may not chance to get any of them. We have seen the organisms so numerous that we could just draw a drop of blood and stain directly for the organisms and show them, and, on the other hand, we have repeatedly drawn

twenty-five cubic centimeters and then get maybe only one colony.

Again, the optimum medium may not be used or the blood may be too concentrated to allow growth, or the action of the blood itself may inhibit the growth. Again, in many cases there is only an intermittent bacteremia, the organisms being discharged into the blood only at certain intervals from a focus, and if the culture is not taken when the organisms are circulating there may be no growth. Hence, the importance of taking cultures repeatedly, not depending upon a single culture, and the importance of taking cultures at suitable times.

Regarding positive cultures, such a culture is one of the greatest aids in diagnosis and prognosis that we can have. Time and again, when the clinical condition pointed rather to malaria or to typhoid or pneumonia, the finding of the causal organism in the blood has pointed to the true condition. This has been true in cases in which the last condition to be thought of was sinus thrombosis, and yet such was proved to be the case. We can learn a great deal from repeated cultures in cases in which we have once obtained a positive result. In cases in which the number of organisms is lessening, or in which the organisms have disappeared and in which the primary focus has been successfully treated, a good prognosis is probable. On the other hand, when the primary focus has been eradicated and there are no metastases, including of course endocarditis, and the organisms are still present, then we may assume that the organisms have become habituated to their host and are multiplying in the blood, and a poor prognosis is probable.

Again, it might here be emphasized that bacteremia results from extensive surgical measures in the throat, such as tonsillectomy, and especially from improper surgical intervention in the mastoid, such as wounding the sinus. This class of cases has been admirably dealt with by Dr. W. A. Scruton in a paper last year, and two additional cases have come under my notice recently, one recovering after the formation of metastases and the other going on to a fatal termination. A short résumé of these is to follow.

The most important thing, to our mind, is the fact that nearly all of our cases recovered, that the percentage of recoveries with sinus thrombosis is getting steadily larger. Sur-

gical intervention is not always necessary, as is evidenced by the cases reported by Dr. McKernon last year, where, in the face of positive blood cultures in two cases, operation was refused but recovery ensued spontaneously, either with the use of vaccine or without. It might here be added that in most of our cases vaccines have been used, and they seem to exert a decidedly beneficial action. These cases will be reported when the series is large enough to warrant.

A few cases will now be cited to illustrate some of the points mentioned above:

Case 1.—Bacteremia, extending through mastoid and secondary to mastoiditis and sinus thrombosis, caused by surgical measures in the nasopharynx. Removal of nasopharyngeal tumor. Double mastoiditis, sinus thrombosis and metastases. Blood cultures repeatedly positive—the streptococcus mucosus capsulatus. This organism was demonstrated in the nasopharynx, the middle ear, mastoids, in blood culture, in the clot from sinus and the sinus wall, and finally in pus from the ankle joint. Blood culture finally became negative and recovery took place. It might be noted that this organism is often found in the normal throat.

Case 2.—Bacteremia following tonsillectomy. Patient admitted for acute otitis media. Ear cleared up. Within a week the tonsils were removed. Following this the patient became septic, and repeated blood cultures finally showed the presence of streptococcus hemolyticus in large numbers. Blood cultures taken when the temperature was low were generally negative, and when high showed many organisms, thus emphasizing the importance of the time of taking a culture. Nothing further surgically was done for this case and she went on to complete recovery.

It is interesting to note in this case that we had an acute ear condition to deal with at first, but that the bacteremia seemed to be due to the tonsillectomy. This patient had a perfectly normal temperature at times at which we had very positive cultures.

Case 3.—Illustrating the effect of injury to the lateral sinus. In the course of a radical mastoid operation the sinus was accidentally opened. The organism that had been isolated in the ear discharge had been the streptococcus mucosus capsulatus. The patient did poorly for a long time after the oper-

ation, and gradually went into a septic condition, giving positive cultures of the above organism. A metastasis into the lung took place, but after resection of the jugular the patient gradually recovered after a convalescence of ten weeks.

Case 4.—Injury to sinus, followed by death. Simple mastoidectomy. Sinus accidentally opened by the curette. Hemorrhage stopped by iodoform gauze. Normal course of convalescence with no evidence of sepsis. Three weeks after, the patient returned from out patient department to ward, delirious and very ill. Blood culture shows a growth of streptococcus hemolyticus in less than eight hours. Immediate operation. Sinus found thrombosed and jugular vein thickened and thrombotic. Death occurred within twenty-four hours.

The importance of such a case, aside from the injury to the sinus, is that it shows the typical course of such a case of thrombus. Immediately after the injury we have the formation of a clot and the shutting off of the vein. At this time the few bacteria that may be in the clot are prevented from reaching the blood stream, and in some cases they are killed off by the action of the antibodies of the blood serum. Later on if these are not killed off, the clot undergoes purulent softening, as it did in this case, and septicemia and death ensue. There is no doubt that if such cases are seen early enough the resection would limit the process.

Case 5.—Case in which paratyphoid was isolated from the blood.

LXVIII.

REPORT OF A CASE OF INTENSE VERTIGO RELIEVED BY PUNCTURE OF THE DURA IN THE NEIGHBORHOOD OF THE INTERNAL AUDITORY MEATUS.*

By L. W. DEAN, M. D.,

IOWA CITY.

Mrs. J. O., family physician, Dr. Evans of Grinnell, Iowa; was referred to me by Dr. C. P. Howard, on October 4, 1914, for examination as to the cause of vertigo.

History.—Mrs. J. O.: entrance complaint, stomach trouble; extreme vertigo with vomiting. Patient is white, aged fifty years, born in England, came to this country about six years ago. We were able to secure a very complete family history, which was entirely negative so far as the patient's trouble is concerned. Patient has had measles, smallpox, tonsillitis twice in the last six years. Eighteen years ago the patient had rheumatism with swollen elbows, wrists, knees and ankles. At this time she was in bed for six weeks, and was so ill a part of the time that she was unable to feed herself. Since that time she has had occasional insignificant pains in the joints. There has been no chronic cough. Before marriage she was subject to asthmatic attacks. The patient was married at the age of twenty-two; had eight children, five of whom are living. One child died at the age of two days. One, the first child, at the age of one month. And the other, the third child, at the age of eleven months. Patient had one miscarriage after the last child. Menses began at the age of eighteen and became regular after the age of twenty-one. Menopause has not yet occurred. Patient states that she has always had slight temporal headaches, beginning in the morning and lessening during the day. Patient has never had any earache or discharge from

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either ear. At the age of seven or eight she fell down stairs and was knocked unconscious. Immediately following the fall she was unable to hear any sound. She remained deaf in each ear for about two years. She does not remember how her hearing was restored, whether suddenly or gradually. This part of the history is necessarily exceedingly unsatisfactory. Careful questioning of the patient last fall and again within the last few weeks has failed to reveal any more definite information. I got the impression that she was not entirely deaf in each ear. If so, the return of hearing would have made a more distinct impression.

History of present trouble.—Three and a half years ago the patient noticed that she had slight attacks of dizziness. Six months later, with the attacks of dizziness there was vomiting, and at this time she began to be bothered with noises in the head. One year later—that is, two years ago—she noticed that the hearing in the right ear was getting poor. These attacks greatly increased in frequency and severity until now she is having them once or twice a week, and they are so severe that it is necessary for her to go to bed. The only way that the patient can get relief is by sleeping. These attacks come on at any time during the day, sometimes they make their appearance when she is asleep at night, the nausea causing her to wake up. Patient states that she has never been unconscious during one of these attacks. She often falls if there is nothing for her to get hold of. If there is a table or some support handy, she has no difficulty in getting hold of the object and supporting herself. If she is engaged in hard work the number of attacks greatly increases, sometimes being as many as five a day. The attacks come on without warning and without an appreciable cause. When lying in bed it seems as if everything were sinking from her. She is intensely nauseated and vomits continually. Lying down or changing her position does not help the matter at all. The attacks last from a few minutes to several hours, but some dizziness always remains throughout the day of the attack. If she can get a sound sleep she is not nauseated again until she has another attack. The vomitus is not sour. Sometimes it is burning, and again bitter. There is no pain about the head preceding or during these attacks.

Shortly after the patient was referred to our service she

had an attack. The attack was very similar to the one which she described. The patient fell to the right and fell onto one of the patients lying in an adjacent bed. After the attack was over she was questioned carefully about this, and had no remembrance of having fallen upon the bed. The attack which the patient had was exceedingly severe, the vomiting and the retching causing much misery.

The patient is a fair haired woman with a sallow complexion. She gave the impression of being very uncertain of herself and of undergoing much suffering. That she was emaciated was evidenced by the rapid increase in weight after the eradication of the trouble.

Dr. Howard's examination of the general condition and of the nervous system was negative, except for a distinct Rombergism with the eyes closed. There was nothing about her gastrointestinal tract that would be responsible for her vomiting.

The patient remained in the University Hospital and was under constant observation from October 2d, the date of her admission, until December 26th, the date of her operation. It was only after the prolonged careful study of her case that operation was advised. I will take up the history in her case and give the findings as they changed while she was under observation.

A Wassermann test of her blood and spinal fluid was made on admission. At various times while in the hospital spinal punctures were made. Several times the Wassermann test was made. At the time of operation a Wassermann test was made of the cerebrospinal fluid removed from the posterior fossa. In every case the reaction was negative. For a period of six weeks, while the patient was in the hospital, active syphilitic treatment was given without result. In short, during this time the patient became gradually worse.

Bromids were administered also without result. Fluid was withdrawn from the spinal canal at various times, both during attacks and intermissions. In every case the pressure was normal and the laboratory report negative. The influence of the spinal puncture upon the attacks was marked, the vertigo and vomiting always being lessened within a short time, but never entirely controlled.

The attacks.—In the early part of the patient's stay in the

hospital she had one or two attacks a week. The attacks were similar to those described in the history. During the two months that she was under observation they increased in severity and frequency. During the attacks the patient had a tendency to fall to the right. In the periods between the attacks, with her feet close together and eyes closed, she would fall to the right and backwards. In the earlier attacks a slight rotatory nystagmus to the right could be detected. During the quiescent periods there was no spontaneous nystagmus. When the nystagmus was present the patient would fall to the right, irrespective of the position of the head. This nystagmus was more marked with the succeeding attacks, and in some of the later and more severe attacks the rotatory nystagmus was present to the right and to the left, but always far more marked to the right. During the latter part of the time that she was under observation, spontaneous rotatory nystagmus to the right could be detected between the attacks. Fields and fundi were normal. For several weeks preceding the operation the patient complained of occasional attacks of pain in the occipital region. There was no pain on pressure over the mastoid vein.

Examination of the ears on admission.—Right ear: loud spoken voice heard at four inches. Power of hearing low notes normal. High notes markedly diminished, C_4 not heard at all; Rinne negative; Weber to the left; drumhead normal; tube open. Left ear: whispered voice at thirteen feet; Rinne positive; limits for low and high notes not constricted; drumhead normal; tube open.

The hearing in the right ear gradually diminished while under observation, and in about six weeks the right ear was absolutely deaf. The left ear remained apparently normal.

Caloric test.—Right ear, with water at sixty-eight degrees, positive reaction in thirty seconds. Nystagmus lasted two minutes. Left ear, approximately the same. The caloric test was applied to the right ear a number of times while she was under observation, and again following her operation, and finally during the last week. It was always the same.

Following the operation there was slight change in the hearing in the right ear. A test was made a few days ago, and the patient could hear the loud voice but not recognize the word.

Pointing tests.—At all times the reactions in the legs and elbow joints were normal. Up until the patient had been under observation six weeks the pointing test for the wrist joint was also normal. About the seventh week of observation the following reactions were noticed: Wrist motions in the absence of nystagmus, right hand palm down, finger to the right. Right hand palm up, no deviation. Left palm down, no deviation. Left palm up, no deviation. Induced nystagmus to the right, using cold water in the left ear: right palm down, finger deviates to the right. Right palm up, finger deviates to the left. Left palm down, finger deviates to left. Left palm up, finger deviates to left.

The persistence of the deviation of the finger to the right with the palm down was perfectly plain. The test was repeated several times and demonstrated to various observers. Because of the nystagmus to the diseased side, or when present in both sides, more marked to the diseased side, the tendency to fall to the right and backwards, irrespective of the nystagmus and the position of the head, the gradual increase of the nystagmus, always remaining more marked to the diseased side, and because of the condition being relieved by spinal puncture, a lesion in the posterior fossa was diagnosed.

It was difficult to conceive of any lesion except a cyst or a collection of fluid between the meninges that would persist for three years without becoming much worse than it now was. So before the pointing test was positive for a cerebellar lesion, a diagnosis of a collection of fluid in the posterior fossa in the cerebellar pontine angle was made, and exposure of the dura with massage or puncture advised. With the appearance of the pathologic pointing test a positive diagnosis of lesion in this neighborhood was made, and operation more strongly urged. Early in December the patient's condition was such that she was willing and anxious to try almost anything, and on December 26th she was operated.

Operation.—December 26, 1914, under ether anesthesia, the usual mastoid incision with a posterior horizontal incision at right angles to it was made. The lateral sinus was exposed. It was found to lie far forward near the wall of the external auditory canal. The antrum was opened and the dura of the cerebellum exposed internal to the ascending limb of the lateral sinus. Following our usual custom when incising the

dura, the dura was painted with tincture of iodine and the wound thoroughly dried. A vertical incision one-half inch long was made in the dura three-fourths inch internal to the lateral sinus at a distance of three-fourths inch below the knee. When the dura was first incised there was but a slight flow of fluid and the brain substance prolapsed in the wound. In about one-half to one minute after the completion of the incision it acted very much as if something broke, and clear fluid flowed from the wound as water flows from a spring. Dr. Charles Rowan, who was present at the time of the operation, as well as myself and other observers, was very much impressed by the force of the escaping fluid. About three and one-half test tubefuls of fluid escaped. There was no change in the patient's pulse or respiration at the time the dura was punctured or when the fluid escaped. I regret very much that we did not have prepared a special manometer for measuring the pressure of the fluid. A specimen was sent to the laboratory, and reported as apparently normal cerebrospinal fluid mixed with blood. There was no increase in leucocytes, and the Wassermann was negative.

Following the operation there was no disturbance of the facial nerve. Two days later the patient complained of slight dizziness after she first opened her eyes. This lasted but a few minutes. There was a slight rotatory nystagmus to the right. Three days after the operation the nystagmus had entirely disappeared. Several times in the four days following the operation the patient complained of attacks of nausea and dizziness. Each time these were immediately relieved by dressing the wound. At each dressing some cerebrospinal fluid escaped.

On the eighth day following the operation the patient suffered from slight nausea and vomited. There was a little rotatory nystagmus to the right at this time. On the ninth day she had a similar attack. After that her recovery was uneventful. There were no further attacks or vomiting, no rotatory nystagmus.

Four weeks after the operation careful examination was made. There was total deafness in the right ear. Caloric test in the right ear was positive in one-half minute; pointing tests were normal. The patient had a good appetite, was eat-

ing well and gaining weight. Six weeks following the operation the patient left the hospital.

She returned for examination on April 9th, about four months after the operation. She reported that since leaving the hospital she had not had any trouble whatever except deafness in the right ear and a slight tinnitus aurium. She has increased in weight, appetite is good, and she feels exceedingly grateful for what has been done.

Examination.—Right ear, can hear loud sounds, but is not able to recognize the voice. Caloric positive in one-half minute. Pointing tests are normal. There is no Rombergism; no spontaneous nystagmus. The patient feels that she is entirely well.

Our diagnosis before operation was a collection of fluid in the cerebellar pontine angle, probably the result of adhesions between the meninges as a result of her injury forty-two years ago. The findings at the time of operation, together with the results, lead me to think that the diagnosis is correct, notwithstanding the fact that an exact determination of the condition present could not be made.

The case is very similar to the cases reported by Bárány, except in his patients, immediately following the spinal puncture the patients became worse and then were later relieved, while with the case just reported the partial relief followed immediately the spinal puncture.

As to whether the loss of hearing is due to pressure directly upon the nerve, or to increased pressure within the cochlea, I do not know. The other cranial nerves located in the cerebellar pontine angle did not have their function disturbed. With the very slight increase in hearing in the four months following the operation the prognosis for the return of hearing, in my judgment, is very bad.

LXIX.

THEORIES CONCERNING PARACUSIS WILLISII.*

BY GEORGE M. McBEAN, M. D.,

CHICAGO.

Since 1672, when Dr. Thomas Willis¹ of Oxford and London published his report of the first case of that form of paracusis which bears his name, many theories have been advanced to explain the phenomenon. But from the variety of opinion by the world's great otologists and physicists, it is evident that there is room for at least one more theory.² It stirs one's imagination to read of the seventeenth century highborn lady who was very deaf under ordinary circumstances, but heard quite well during the rolling of drums, so that when she went walking she was always followed by her servant who carried a drum; and when she desired conversation her servant would beat the drum, so that she might hear. I think this is the most picturesque case of paracusis Willisii in literature.

Numerous other instances were later reported of deaf persons who heard better in noisy places, and it became generally recognized that this was an unfavorable symptom. It remained for Politzer³ to show that it was not necessary to have noise to produce improved audition, for, as he found, a toneless, rapidly vibrating instrument brought into contact with the cranial bones will produce the same result. This proved that it was not tones and noises as such, but only as modes of motion, which were causative factors. The symptom as usually described is that the patient hears better riding in vehicles, trains and street cars or in machine shops.

Joseph Toynbee was the first to show that paracusis Willisii belongs to the symptom complex of stapes ankylosis, especially of the otosclerotic type. (Lucae.⁴) In fact, it is one of the most characteristic symptoms of otosclerosis. Körner⁵

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says it is the only phenomenon of this disease that is not cleared up by the anatomic findings.

According to Politzer, Lucae and Roosa, it is never found in cases of nerve deafness unless complicated by trouble in the sound conduction apparatus.⁶ But, on the other hand, it is not constant in all cases of otosclerosis, or even in both ears of the same patient. This reminds us of the fact that the disease process involves various parts of the labyrinthine capsule in different cases, as shown by section. It is unfortunate that so few cases diagnosed as otosclerosis with full examination records ever come to autopsy, and I am not aware that any mention of the peculiarities of paracusis Willisii has been made in the cases published. When Norval Pierce published his masterly paper in 1907 on spongification of the labyrinthine capsule, less than forty cases had been reported in which the diagnosis made during life was confirmed by section.⁷ But, according to our present knowledge of otosclerosis, it is the cases with most marked loss of lower tone limit—i. e., those with most marked stapedial fixation—that show most characteristically this form of paracusis.⁸

It is interesting to review a few of the theories advanced by our modern writers, especially keeping in mind the known pathology. There is so little written directly concerning paracusis Willisii that I cannot refrain from quoting from the address of Charles J. Heath, published in 1911,⁹ though there are few who will agree with his premises or conclusions. He says: "The action of the stapedius muscle is to pull the head of the stirrup bone backward and drive part of the footplate, accompanied by the membrane surrounding and attached to it, against the labyrinthine fluid." . . . "Its effect in increasing the pressure on the fluid in the tiny closed labyrinth is considerable, and scarcely any obstructive tympanic condition (save the rare bony fixation of the stirrup) is capable of completely arresting its action, which is to increase labyrinthine pressure."

It will be noted that this is directly contrary to the accepted teaching that the stapedius muscle tilts the footplate out (thereby antagonizing the tensor tympani) and decreases labyrinthine pressure.

And when Mr. Heath speaks of the deafness accompanying paracusis Willisii as "pocket handkerchief deafness" with "relaxed drum membranes and joints," it is evidently of a clinical

entity which is not the same as we are accustomed to regard as the usual accompanying factors of paracusis. As he gives none of his tuning fork findings, I am unable to say whether or not Bezold's triad is present. It is sufficiently evident, however, that he does not agree with his distinguished predecessor, Joseph Toynbee,¹⁰ who regarded paracusis Willisii as especially characteristic of the later stages of stapes ankylosis.

Phillips¹¹ and Gould¹² say that it is "supposed to result from compression of the labyrinth in the form of otopiesis," "with contraction of the tensor tympani muscle." The question here is what possible effect could contraction of the tensor tympani muscle produce in the presence of an immovable stapes, and why the labyrinth could be compressed?

Dench¹³ says: "Urbantschitsch explains the phenomenon by the action of loud sounds serving to stimulate the receptive centers, after which relatively feeble stimuli may be perceived." But he offers no basis for this theory. And if true, why should not persons with normal hearing hear better in noisy places? Dench further says: "The acuteness of audition upon one side for any given sound will be increased if the organ of the opposite side is at the same time brought under the influence of sound waves of a different character." The error of this proposition is demonstrated daily at the telephone when one naturally stops the open ear with the finger to shut out annoying extraneous sounds.

Politzer says: "Löwenberg and Urbantschitsch attribute this phenomenon to an increased irritability of the acoustic nerve, brought about by general concussion." This I admit to a certain extent, but why, then, are all forms of deafness, and especially the nerve type, not also benefited by noise and concussion, which we know absolutely is not the case?

Politzer¹⁴ himself comes nearer the root of the matter than the others when he says: "The terminations of the acoustic nerve are also thrown out of their equilibrium, which causes them more easily to be excited by the waves of sound." He believes the shaking of the ossicles is also responsible.

Bezold¹⁵ in Holinger's translation says: "It is, therefore, probable that a practically immovable sound conduction apparatus is more sensitive to weaker impulses during the time when a shaking of the whole body keeps it vibrating."

It seems like heresy to question these master minds, but it

must be asked if there is any longer a sound conduction apparatus when its most important link, namely, the fenestrostapedial articulation, has become ossified? The sound conduction apparatus has then ceased to exist as a specialized mechanism.

The hypothesis which I advance, with some temerity, it is true, is built on grounds which have been widely accepted by otologists and physicists. The only added factor which I ask you to accept is that our atmosphere is in constant motion, and few who live in Chicago will deny that.

I quote from Bezold¹⁶ again: "Edward Weber advances the theory that the whole sound conduction apparatus, together with the column of water which runs up the scala vestibuli and back the scala tympani, moves backward and forward as a whole with each sound wave. The very flexible and yielding membrane of the round window acts as a siding." Von Helmholtz found the mathematic proofs for the accuracy and even necessity of this theory. He taught us, furthermore, that the drum membrane, together with the ossicles, forms a wonderful lever apparatus which is able to convert large movements of low power into small movements of high power at the footplate of the stirrup, which is suspended at the ligamentum annulare. (Edelmann, 1: 778.)¹⁷

This whole apparatus, according to Riemann, is so well balanced that the smallest amount of energy is sufficient to overbalance it.

Toynbee¹⁸ says, in speaking of stapes fixation: "The membrane of the fenestra rotunda and the fluid of the labyrinth participate in this fixed condition."

If we accept these theories of Weber, von Helmholtz and Riemann as true, then we must admit that normally the lymph as a whole is in constant to and fro motion. Shambaugh¹⁹ has pointed out the similarity in nerve endings between the vestibular and cochlear apparatus, cupula and otolith in one case corresponding to the tectorial membrane of the hair cells of Corti's organ in the other.

Our present conception of the movement of fluid as a whole in the semicircular canals, in order to make the nerve endings in the ampullæ capable of perceiving motion, must be comparable to the movement as a whole of the fluid in the spiral canals of the cochlea, in order to make the nerve endings there capable of perceiving sounds.

But the fluid of the vestibular portion is influenced only by motion or position of the head, while the fluid in the cochlear canals is constantly being moved by the footplate of the stapes.

It is the low pitched sounds which have the greatest amplitude of vibration. Even vibrations in the surrounding air too slow to be perceived by the human ear as sound may still have their influence in moving a normal stapedial footplate, and so keeping the cochlear lymph in constant motion.

Bezold,²⁰ by manometric measurements, found "that the membrane of the fenestra rotunda was capable of an excursion of more than one-third millimeter, while that around the base of the stapes was only one-sixteenth millimeter. The membrane of the fenestra rotunda is therefore capable of performing excursions five times greater than that of the footplate of the stapes."

This lax membrane, together with the aqueductus vestibuli and cochleæ, acts as a siding or safety valve to prevent sudden compression of the labyrinth from injuring the delicate terminations of the auditory nerve.

In otosclerosis producing ankylosis of the stapes the low-pitched sounds are lost, and, therefore, the greater the degree of ankylosis, the less movement of the fluid in the cochlea, as was pointed out first by Toynbee.

But, as we know, sounds and soundless vibrations are practically ever present, so the normal relation of the tectorial membrane to the hair cells of the organ of Corti²¹ must be in a moving fluid, and these to and fro movements must keep these nerve terminations in a certain state of tension. When mass motion ceases through stapedial ankylosis, this relation is no longer normal, and the auditory nerve becomes less capable of responding to sounds in proportion to the loss of motion of the endo- and perilymph.

In the normal ear the function of the membrane of the fenestra rotunda is a passive rôle; it is only when the normal agent for producing motion in the cochlear fluids (i. e., the stapes) become ankylosed that the membrane of the round window assumes a more active rôle. But it requires a great stimulus to do this, vibrations of wide amplitude and great power, as the rolling of drums, the whirr of heavy machinery, the roar of a railroad train, or the rumble of a wagon, which cause such a commotion that the relatively lax membrane of

the round window, and with it the cochlear lymph, move back and forth in something like their normal motion. At the same time the hair cells attached to the tectorial membrane, stimulated by the ebbing and flowing lymph stream, resume their function as sound receivers, and so continue as long as the artificial mass motion continues. This is the paracusis which Willis described, and which has remained unexplained for two and one-half centuries, waiting for Shambaugh's theory of tone perception to unlock the door.

A necessary corollary of my hypothesis is that in cases of bony stapes ankylosis without paracusis Willisii, the process of spongification must have involved the recess of the fenestra rotunda, thereby preventing all mass motion of the cochlear lymph, and these cases would probably show a greater loss of upper tone limit.

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THE POSTOPERATIVE ANTISEPTIC TREATMENT
OF THE TONSILLAR FOSSÆ.*

BY GEORGE PAULL MARQUIS, M. D.,

CHICAGO.

It is not my purpose this evening to say anything on the question of tonsillectomy versus tonsillotomy, nor on the respective merits of the dissection method or the Sluder operation. Far be it from me to start anything—the champions of the various forms of technic can rest easy on this point. I do, however, wish to make known a procedure which I have followed for a year, and which has greatly reduced the unpleasant after-effects of a tonsillectomy.

I used to be confronted with a number of conditions which were decidedly unpleasant, to say the least, and it was to relieve these that I began to look for some modification either of my method of operating or in the after-treatment; and as the latter seemed the easier upon which to experiment, I chose it and continued to perform the operation as I have done for the past few years.

I had frequently noticed a good deal of reaction along the pillars in the fossæ, and occasional edema of the uvula; with these conditions was associated great soreness in the throat, difficulty in swallowing and impaired speech.

There was a heavy fibrous exudate in the tonsillar fossæ which persisted for from four to seven days. I noticed that when this was removed with peroxid and then a five per cent solution of silver applied, the pain in swallowing was much less, and it struck me if that fibrous crust could be prevented from forming, we could avoid some of these difficulties. This brought the question, what was the cause of the reaction, the edema and the exudate?

*Read before the Chicago Laryngological and Otological Society, April 20, 1915.

I think we must call it an infection. True, our instruments are sterilized, and we work under antiseptic precautions, but we know that at no time is the mouth free from bacteria.

I am informed by a prominent bacteriologist that there are ten varieties of actively pathogenic and seven of potentially pathogenic bacteria found in the mouth.

As soon as the tonsil is removed we have an open surface for their invasion, and one where, through trauma, the most favorable conditions for their development are presented. If this surface is treated with a strong antiseptic, the infection is greatly lessened, or in some cases altogether prevented. Acting on this theory, we began applying a fifty per cent solution of tincture of iodine to the fossæ immediately after the removal of the tonsil. The result fully justified our action, for none of the symptoms above mentioned were present. We did notice, however, that the membranes appeared to have been treated with an acid, so in the next case the solution was reduced to twenty-five per cent, and this we have continued to use.

The discomfiture has been reduced to a minimum, the great majority of the patients eating without complaint.

In only one case have I seen any edema of the uvula, and I am inclined to ascribe this to an infection which we did not control—possibly through injury to the venous system in that locality.

It may be argued that this exudate is the normal pouring out of lymph as we see after an injury on the surface of the body, and that probably in a measure is true, but why should it be reduced to a minimum and in many cases fail altogether following the use of the iodine?

I have seen cases where on the next day there was some exudate and some soreness, but cleaning this out and applying the iodine again has usually given the desired relief.

I believe that here, as elsewhere, it is easier to prevent an infection than it is to cure one, and for that reason before the patient leaves the table, after retracting the pillars so as to give an unobstructed view to every part of the fossa, the iodine is carefully applied to the entire surface.

We have treated over one hundred cases in this manner, and in only one case has it seemed to have no effect, and the

same soreness, etc., occurred that we used to find before employing this method.

In order to convince ourselves that the tonsillar fossa was less aseptic after the iodine treatment, a series of cases was given this treatment and bacteriologic examinations made before and after operation. Four cases were selected on each operating day, and cultures were made of these throats. At the operation two would receive this treatment and two would not. The next day cultures were again made of the four throats.

The universal finding was that there was less bacterial growth in the cases in which the iodine and alcohol had been used.

Of course, it is necessary that all hemorrhage be controlled before applying the iodine, or it will simply be washed away and no effect produced by it.

It is our custom to have ready a tampon about the size of the tonsil saturated with alcohol. Immediately on removal of the tonsil this replaces it in the fossa and pressure is made for a couple of minutes. This usually prevents the hemorrhage. Where it does not, the pillar is retracted and the bleeding point grasped with a hemostat. The fossa is then painted with the iodine solution, and the same carried onto the pillars and uvula.

As a rule there is almost no soreness the next day, but where any is present, the same solution is applied.

Of course, by far the greater number of our patients have been children, but we have had a fair proportion of adults, so we are in a position to state the result is at least as good in these latter as in the cases of children.

SOCIETY PROCEEDINGS.

ABSTRACT OF THE REPORT OF THE SCIENTIFIC PROCEEDINGS OF THE THIRTY-SEVENTH ANNUAL CONGRESS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

HELD IN NIAGARA FALLS, CANADA, JUNE 1, 2, 3, 1915.

EMIL MAYER, M. D., ABSTRACT EDITOR,

NEW YORK.

The president, Dr. Alexander W. MacCoy, of Philadelphia, in a felicitous address of historic interest, welcomed the members to the thirty-seventh Congress.

Papilloma of the Larynx.

BY THOMAS HUBBARD, M. D.,

TOLEDO.

Cases presenting complications and describing special features of surgery and general treatment were reported.

The first case was like a papilloma, but was diagnosed microscopically to be an epithelioma. Two tumors removed at different periods were pronounced malignant. The treatment was removal by forceps, followed by cauterization, made thorough by means of a fenestrated intubation tube whereby the crystals of trichloroacetic were rubbed into the base without injury to the sound mucosa. No recurrence up to now, about twelve years.

A case presenting asthma as a complication was reported. The larynx was the source of the reflex which excited bronchial spasm of the most severe type, uncontrolled by morphin and adrenalin, and making operative procedures extremely difficult.

Two cases of papilloma in children were reported. Both

had emergency tracheotomy. Operations by direct laryngoscopy and curettement through tube and also through the tracheotomy wound were successful. One case required a second operation in less than a year, the removal of one large papillomatous tumor giving her complete restoration of voice and no recurrence for now a year. The other case, a boy of four, was cured in one curettement by upper and lower route. No recurrence in three years.

Papilloma of the larynx in an adult, operated thoroughly about six times in one year with active recurrence each time, was finally brought to a successful issue permanently by the aid of neck massage. This was begun one month prior to final operation, and it seemed to the operator that the operation was made more easy in that the patient controlled the larynx better than formerly. Massage was continued after removal of many small papilloma from all parts of the larynx except the interarytenoid space, and at this date, now six months, there is a perfectly clear larynx. It seems to the author that massage accomplishes precisely what is aimed at in the tracheotomy: the absolute rest method advocated by Clark and others, and in a much more rational physiologic manner. Normal nutrition is restored and normal functional activity is maintained. The author urges trial of massage in connection with timely operative procedures even in young children, in preference to tracheotomy and prolonged rest.

DISCUSSION.

DR. J. PAYSON CLARK, Boston: I wish to take exception to Dr. Hubbard's view with reference to tracheotomy in children. I cannot agree that leaving the tube in place for a long period hinders the restoration of function of the larynx. I have had patients who have worn the tube for a number of months, and after its removal there was no difficulty in the reestablishment of laryngeal function. It seems to me to be dangerous to remove the tube in children as long as there is any of the growth in the larynx, because there is apt to be an increase of this, and one may face the problem of doing another tracheotomy, which, as is well known, is more difficult than the primary tracheotomy.

I would also like to register a plea for the indirect method of laryngoscopic examination. With the invention of all the

instruments for the direct view of the larynx there is great danger of neglect of the indirect method, which seems to me to be much better for adults.

DR. E. FLETCHER INGALS, Chicago: I would like to ask the reader of the paper about his results with trichloroacetic acid. I cannot understand how it can be used in strong solution. Neither do I understand whether the tube, through which he did the cauterization, was removed immediately after the operation or later. If it was removed at once, was there no swelling or trouble in restoration of function afterward?

Dr. Clark says the second tracheotomy is more difficult than the first. I have not had much experience in this regard, but my recollection is that the second was the easier. I do not see why this should not be the case.

In curetting the growth from below, was it done on sight—could Dr. Hubbard see what he was doing? I would also like to know whether he used an interrupted stitch in suturing.

DR. ALLEN B. THRASHER, Cincinnati: I have not seen cases of papilloma of the larynx very often in adults, because these intralaryngeal growths assume a different character; in children, however, they are very frequently encountered. In these cases one should never operate without telling the patient that the operation probably will have to be repeated. The larynx must be kept clear until the child is fifteen or sixteen years of age. There is always danger of recurrence while the larynx is small. I have kept a tracheotomy tube in for four years without any trouble. It was removed in the meantime, of course, but not left out entirely. In this case I could not see the patient regularly, as he lived one hundred and fifty miles up in the country, and was unable to make frequent visits to Cincinnati. This patient is now perfectly well, and has had no trouble since he was sixteen years old. He wore the tube constantly from his twelfth to his sixteenth year.

I have found tracheotomy more easily performed the second time than the first.

I am doubtful about the advisability of massage. It seems to me that it would increase the blood flow to the larynx, and this increased blood supply would be apt to stimulate growth. I have had no experience in this regard, but it does not appeal to me as being a scientific procedure. I believe the fact that Dr. Hubbard has not had trouble with his cases is due to acci-

dent. I would be afraid to try it in cases of papilloma. In other cases it may facilitate the return of the voice.

In cases of papilloma of the larynx, as in cases of warts elsewhere, I have used nitrate of silver. The mucous membrane of the larynx is much more easily destroyed than that of other parts, but nitrate of silver will not destroy it.

DR. JOHN F. BARNHILL, Indianapolis: It has seemed to me, judging from my own experience, to be impossible, under certain circumstances, to get all the growth out, including the base of the mucous membrane. Dr. Lynch's method is largely in the open, and that is why it will prove successful. In all cases in which I have absolutely cured this class of disease, I have opened the larynx thoroughly and have seen that I actually removed all of the growth. Laryngofissure is not satisfactory in all cases. To open the larynx, to see what is there, and to thoroughly remove it under antiseptic precautions, is a plain surgical procedure, and, with proper closure of the wound, is, it seems to me, the best method.

DR. HARMON SMITH, New York City: A few days ago I had the opportunity of seeing Dr. Lynch operate on a papilloma of the larynx in a boy fifteen years of age. The larynx had been thoroughly cleared out by another laryngologist. The growth recurred. For a number of years the patient wore a tracheotomy tube, with no particular effect on the growth. He finally fell into my hands, and I used fulguration. Then another used radium. The growth would disappear partially and then recur. There had remained a fibropapillomatous mass in the anterior commissure, in the subglottic space. Dr. Lynch operated, curetting out this fibropapillomatous mass thoroughly. He could hold the cords aside and look underneath. I think Dr. Lynch has devised a surgical procedure for these cases.

Dr. Yankauer has invented a method by which fulguration may be used and oxygen sent in in a current; but there is not the deep burning that is necessary for the removal of these deep growths. Fulguration will certainly take off the skin, but that is not sufficient.

There is a difference in the infectivity of these laryngeal warts. In studying a series of cases of warts in children I myself got warts on my hand. There is a great difference between the multiple laryngeal warts in children and those in

adults. In adults it is much easier to get rid of them. Radium, in two or three applications, will remove them in adults, but not in children. We do not know the true pathology of these papillomata. If we destroy the mucous membrane at the base and remove the blood, we may be reasonably sure that the growth will not recur.

DR. LEWIS A. COFFIN, New York City: In the clinic I feel hopeless when I see a lot of children with papilloma of the larynx. We have records, however, of cases in children of removal by radium with no recurrence. A case was successfully treated by Dr. Abbe. Another case was that of a woman, forty-three to forty-five years of age, a singer, who was treated by two applications of radium, lasting from one-half to three-quarters of an hour, with the disappearance of every vestige of the growth. There has been no recurrence for more than three years. I have now under my care a man from whose larynx I removed growths by the direct method. I treated him with applications of monochloroacetic acid, but the larynx filled up completely. One year ago, when he phonated, the larynx was entirely filled with the growths on the arytenoids and in the anterior commissure. Dr. Abbe sent me one hundred milligrams of radium in a tube; this was applied to the growths, and in forty-eight hours they were entirely gone. After the removal of the growth on the epiglottis and the one on the arytenoid had grown smaller, I could see the large growth on the anterior commissure. Another application of radium was made to this for an hour. Five days ago when I saw the man I found the growths had simply withered up. There is still a small growth on the arytenoid and a ridge on the epiglottis.

DR. EMIL MAYER, New York City: I would like to hear the views of the members regarding the etiologic factors concerned in these growths. I have had two cases in adults working in tunnels and breathing compressed air. It seems rather rational that such a thing might occur. Removal by the indirect method has also resulted in the complete disappearance of the growths. If tracheotomy is employed, the tube must be carried for quite a number of years. I have had a case which is illuminating in this connection, and which shows that there is danger after tracheotomy. A little child had so large a papilloma in the larynx that tracheotomy was neces-

sary. While I was cleaning the tube and putting it back again the child nearly passed away. After that I had two tubes, and as soon as one was out the other was put in, and in that way managed very well. The child lived quite a distance from me. One day while at play the child grasped the tape attached to the tracheotomy tube and pulled it out, gave one cough, and, before help could come, died.

DR. D. CROSBY GREENE, JR., Boston: Recurrence followed in a case in which I operated, and the patient went to another laryngologist, who removed the growth by thorough thyrotomy under direct vision. Six months later I saw the patient again, and the larynx was entirely filled with papillomatous tissue. Dr. Lynch's method will not be sufficient unless the immunity of the patient has been established. Within the past six months I have seen a case in which the patient presented warts on the skin simultaneously with papillomata of the larynx. Removal of the papillomata in the larynx was followed, within a short time, by disappearance of the warts on the skin.

DR. HENRY L. SWAIN, New Haven: Many years ago I had under my care two cases of papilloma of the larynx, one in a boy, the other in a woman thirty or more years of age. The boy was intractable and passed out of my hands. Nine years afterward he coughed up the remains of his papilloma. I have seen him within the last two years, and he has no growth at all. If he had staid with me his single papilloma would probably have become multiple. The woman was treated in various ways. I cauterized with pure nitrate of silver and with electricity; I curetted, and rubbed in lactic acid, and despite all this the papilloma returned. Some time ago Dr. Sperry called me in to see a patient, thinking laryngotomy was necessary. I found my old patient, the woman, with several papillomata. She had coughed off one growth, but the others had remained the same for some years. There was never any obstruction in her case. Whether they will become malignant, of course I do not know. In another case I have used alcohol sprayed on the surface of the papilloma, and have certainly prevented the necessity of instrumentation. I have done nothing else in this case, and the larynx is now entirely free. The growths have reappeared four different times, but for ten years I have done nothing but spray the surface with

alcohol. This case is subject to the criticism that the growths might have disappeared if left alone, but I hardly think that true, as they disappeared so quickly under the treatment. At one time there were five distinct papillomata in this case.

DR. WILLIAM E. CASSELBERRY, Chicago: In the glamour of the new we are apt to forget the merits of the old. No one has mentioned the old galvanocautery. At the last congress in Washington I presented a cautery which I devised, and which I have been using ever since. I cannot understand why fulguration possesses any advantage over galvanocautery. After removal of the growth with the forceps, by either the direct or the indirect method—and I have sometimes used both in the same patient—and after curetting (and I have never been able to curette satisfactorily in my own mind, always feeling that I have left shreds), the cauterization of the base with the galvanocautery is desirable. It is the easiest and most convenient method.

DR. HARRIS P. MOSHER, Boston: Did I understand Dr. Hubbard to say that the tracheotomy tube worn for any length of time interferes with the return of the voice? I have not found that to be the case. This particular part of his theory, while very pretty, is not borne out by the facts.

DR. JAMES E. LOGAN, Kansas City: I have had the very best results after curettement. Within the past two years I have had two cases of special interest. In one case there was a suspicion of carcinoma. I removed the growth a number of times, large pieces of what appeared to be fibrous tissue being taken out, and followed this with curettement. There has been no return. Another case was that of a woman, sixty years of age, the mother of nine children. A few years ago she had every evidence of carcinoma. After removing as much as I could of the growth I used the galvanocautery to remove the rest. Today she has as good voice as ever. In another patient, forty years of age, I have prevented recurrence for seven years by the use of the galvanocautery. Fulguration cannot be localized as can cauterization with the electrodes, suggested by Dr. Casselberry.

DR. ROBERT CLYDE LYNCH, New Orleans: My experience with papilloma of the larynx covers sixteen cases. I will give briefly the histories of two or three, which will illustrate the results obtained with the method which I have devised.

The first case was referred to me by Dr. Jackson, by whom the patient, a woman, had been treated for two years. He had reoperated every month or six weeks for recurrence of papilloma of the larynx. The patient then removed to my neighborhood. I attempted to operate, as Dr. Jackson had done, with his forceps and other instruments. The method in my hands was entirely unsuccessful. At that time I began to use the suspension apparatus. The patient was anesthetized, and I carefully dissected out every portion of the growth which could be seen, both above and below the vocal cords and around the epiglottis. I cleared the area entirely. I suspected that I would have a good deal of postoperative edema, and kept the patient in the hospital for several weeks. Healing was perfect. That was a little more than two years ago, and there has been absolutely no recurrence since that operation.

The second case was that of a little boy, reported last year. The patient came into the hospital very much cyanosed, and the fright of coming into the clinic practically stopped his respiration. Tracheotomy was performed and the tube left in place. I thought that would be sufficient to clear up the papilloma, but it had no effect. I operated nine times by the direct method, clearing out each time as much of the growth as I could see. Each time the papilloma recurred. Then I attempted thyrotomy. With the tube in place I opened the thyroid. The child was two years old, and this was very difficult. I was not successful in cleaning out the larynx entirely, and in the course of three weeks it was again filled with papilloma. I left the child alone for six months, with the tracheotomy tube in place. In the meantime I was trying to learn some new method for dealing with such cases. Finally I suspended him, and dissected out the growths as far down as the end of the tracheotomy tube. That was two years ago, and I saw the patient just before I left home. There was no recurrence. I took out the tube twenty-four hours after doing this dissection. It was the first time in two years that the child had been without it. He had some voice at the end of twenty-four hours, and in two weeks his voice was as good as ever.

The third case was that of a negro woman. I dissected out the papilloma in the same way, and she returned home. She was very religious, had attacks of "hysteria," when she

"shouted" and sang, as the negroes do in their meetings, and at the end of six months she came back with papilloma of the larynx. All my operative work in this case had been devoted to the region above the vocal cords. I thought this the first case in which I would have to report recurrence after operating with suspension. In looking over my records, however, I found that our previous efforts had been confined to the region above the cords, whereas the present papilloma was below the cords. This was dissected out, and there has been no recurrence.

It is impossible to remove papillomata completely by any method of punching or pinching or biting, using the forceps in one hand and some other instrument in the other. It is for this reason, I think, that we have so much recurrence. In the sixteen cases in which I have operated by dissection with suspension there has been no recurrence up to the present time.

DR. HUBBARD, closing the discussion: I think Dr. Lynch has devised the most surgical and precise method of dealing with these growths. All, however, have not the apparatus for this particular work, and so there is a field for the older procedures. I have found it a very useful procedure to put interrupted stitches in the tracheal ring. One must have a free field, snipping off, if necessary, all the isthmus which obscures the view. I usually take up the trachea and put in silkworm gut, about one-third back, through the ring in a child. In other words, I want it as firm as possible. The suture is placed between the cellular tissue and the tracheal ring, one stitch on either side, drawn together, and the ends left long. The ends are brought out on the neck and fixed with adhesive plaster. One can then pull on these and draw the trachea and the larynx forward, getting a glimpse of the lower end of the larynx. Otherwise the curetting is done blindly. Thorough curettage of the larynx can be accomplished by this method with curettes of various sizes and angles. If the papillomata are "ripe" they can be gotten out at the base; those that are in a state of active growth cannot be entirely removed. I always inspect the growth from above prior to curettement.

In using the trichloracetic acid I simply moisten a small swab, smear with the crystals, and go over the surface with

this. The tube is fenestrated, it is inserted in the larynx, and is left there.

I want to call attention again to massage as a factor in producing the condition which brings about the restoration of the normal processes of the larynx. Any simple method like massage is superior to the absolute rest of the larynx induced by the prolonged wearing of the tracheotomy tube.

Some Statistic Observations on Oto-Laryngologic Diseases Among Negroes, Based on Fifteen Hundred Cases.

By DUNBAR ROY, M. D.,

ATLANTA.

It is surprising how few negroes present themselves for nasal diseases. Out of the total fifteen hundred, only three hundred and forty-one came for nasal complaints. Spurs and deviations are very rare. The writer has never seen a deviated septum in a full-blooded negro. In the writer's opinion, this is due to two causes. In the development of the maxillary bones you never see a contracted and high arched palate among negroes. This tends to substantiate Mosher's argument as to the importance of the premaxillary ridge in the causation of septum deviations.

2. Traumatism as a causal factor is rare because of the protruding brow and soft resilient cartilages externally. Acute inflammation of the accessory sinuses was exceedingly rare, due, in the writer's opinion, to the free ventilation in the nasal cavities. Only chronic necrosing ethmoiditis with polypi occurred more frequently than other chronic sinus diseases. Hay fever occurred in only two cases, and did not differ in symptoms from that seen in the white race. Atrophic rhinitis was seen in one case only, which would seem to disprove that theory making large nasal passages a predisposing cause for this condition. No case of chronic maxillary abscess was seen. It is a well-known fact that few negroes have bad teeth. Syphilitic lesions were frequent, as also purulent rhinitis in the young, which readily yielded to antisyphilitic treatment of the old regime—i. e., mercury and iodid of potassium.

3. Pharynx, epipharynx and larynx. There were one hundred and six cases involving these parts, by far the largest

percentage. Diphtheria is exceedingly rare in spite of the poor hygienic surroundings of many of these people. Laryngeal tuberculosis occurred only twenty-three times. Laryngeal and pharyngeal syphilis, two hundred and seventy. Adenoids and enlarged faucial tonsils occurred two hundred and ninety-six times, which refutes the statement made several years ago that adenoids are very infrequent among the negroes.

DISCUSSION.

DR. CHARLES W. RICHARDSON, Washington: In the main my observation is in accord with Dr. Roy's, but this is not the case with regard to the apparent immunity of the negro to diphtheria. For a number of years I had charge of the diphtheria ward in the Government Hospital in Washington, which was, in fact, the municipal diphtheria ward. There were practically no negroes in it. I do not remember a case of laryngeal diphtheria in any of the wards. I never intubated a negro child in my whole experience.

My experience is not in accord with Dr. Roy's with regard to the presence of adenoids and enlarged faucial tonsils in negro children. I think some of the worst cases of adenoids I have ever seen and operated on have been in negro children. Some years ago I was inclined to believe that negroes do not have this condition, but latterly, probably in consequence of school inspection, they come into the clinics in great numbers.

Syphilis among negroes is quite general in Washington as well as in Atlanta.

True Myxoma of the Rhinopharynx—Report of Two Cases.

By VIRGINIUS DABNEY, M. D.,

WASHINGTON, D. C.

Extreme rarity of true myxoma anywhere in the body, but especially in the rhinopharynx, leads to report of two cases. Some pathologists reject entirely the term, believing no such pure tumor exists. However, sections show absolute absence of any fibrous elements.

Case 1.—Tumor seen on drawing forward soft palate. Under ether, large adenoid curette fitted over growth which

was removed from attachment to the basilar process. No recurrence after ten months.

Case 2.—Two growths found at operation. Only one could be seen at examination; smaller attached to basilar process, larger to posterior ethmoid. Both were divulsed with large adenoid forceps. Patient had had similar growth removed eleven years before. Photographs of growths and of microscopic sections were given.

DISCUSSION.

DR. HARMON SMITH, New York City: This must be the exception which proves the rule. It has been definitely stated by many histologists and pathologists that true myxomata do not occur in this region. In the majority of instances myxoma has sprung from the ethmoid or somewhere else; mixed fibroma and myxoma, on the other hand, arise in the nasopharynx. So far as I know, there has been no other case reported of true myxoma springing from this region.

DR. JAMES E. LOGAN, Kansas City: I would like to ask the nationality of these patients, especially the one with the very large growth. It often happens that these growths appear in individuals of certain nationalities. Those of Scandinavian birth are more apt to have them than any other class of patients. I have had two pathologists at variance on two cases, one operated by myself and the other by Dr. Fenger. One pathologist said there was every evidence of myxoma, the other, that it was fibroid or myxofibroma. The tumor in one case, a boy of Swedish nationality, was attached to the basilar process.

DR. DABNEY, closing the discussion: One patient was German, the other American. What Dr. Smith says about the origin of these growths is the excuse for this report. They are supposed never to occur. I had the specimens examined by very skilled pathologists in Washington, at Howard University—a school for colored students, having very excellent pathologists—and also at the government school. They are true myxoma. I have looked up the literature, and there are no other cases reported of true myxoma of the rhinopharynx.

The Surgical Anatomy of the Socalled Capsule of the Fauical Tonsil.

By G. HUDSON MAKUEN, M. D.,

PHILADELPHIA.

The socalled capsule of the faucial tonsil is not a capsule at all, in a strict sense of the term, and it consists, in part at least, of that portion of the intrapharyngeal aponeurosis in a recess of which the tonsil attaches itself during the course of its development.

The intrapharyngeal aponeurosis is a broad membrane having its attachment above to the base of the skull, and extending downward it not only separates the tonsil and the palatal pillars from the superior constrictor muscle and other important tissues in the cervical region, but folds of this membrane protrude themselves between the tonsil and the pillars of the palate, and the anterior fold when it protrudes itself well in front of and below the tonsil constitutes what is known as the *plica triangularis* or *plica tonsillaris*.

In the course of its development in embryo and during infancy, the tonsil appears to appropriate a portion of the connective and musculofibrous tissue with which it is in juxtaposition, and finally in adult life it becomes firmly attached to this membrane to which has been given the name intrapharyngeal aponeurosis, and a portion of which seems to constitute the socalled capsule of the tonsil.

As usually performed, therefore, a complete extracapsular tonsillectomy must leave a window resection of the intrapharyngeal aponeurosis, not only exposing the palatal pillars and the superior constrictor muscle, but opening up avenues of infection in the deeper regions of the neck.

A more desirable operation, which may be called an intracapsular tonsillectomy, or better still, an intercapsular tonsillectomy, is one in which the tonsil is removed with only the thin innermost layer of the capsule, the major portion of it being left in the pharynx as a complete lining for the fossa, where it serves as a strong wall of defense against infection in this region. This intra- or intercapsular tonsillectomy may usually be done easily and accurately with an ordinary snare in connection with the Sluder tonsillotome, and sharp cutting instruments are not required except in those rare in-

stances where pathologic adhesions have formed between the tonsil and the mucous membrane covering the adjacent pillars.

DISCUSSION.

DR. WILLIAM E. CASSELBERRY, Chicago: I am very glad to have heard this definition of terms. I have been doing the same operation that Dr. Makuen has been doing, but whereas he called it the intracapsular method, I have been calling it the extracapsular method. I still object to his term intracapsular for either his way or mine. Intercapsular would be a better term than intracapsular, it seems to me. Whether the capsule develops from the aponeurosis or from the tonsil itself matters not. I would not, in either event, forget the word capsule, for surely, as we see it, it is a capsule of the tonsil. The tonsil is enveloped in a smooth membrane which can be separated from the major portion of the aponeurosis. The smooth dissection of the capsule from the major portion of the aponeurosis is, I believe, the best operation. It results in no distortion of the pharynx. In the majority of instances it is unnecessary to cut much of the plica or mucous covering of the pillar itself. Cutting the covering of the pillar is one of the things which results in infection and distortion. I, too, have been struck by the difference in the thickness of the capsule. Sometimes, when I have exposed a piece of muscle, I have thought I have gone too far, and when I have tried to get only a thin portion, I have gotten a thicker portion.

DR. J. GORDON WILSON, Chicago: If the surgical anatomy of the tonsil is different from the anatomy, I miss Dr. Makuen's point. I cannot understand how he can call the part of the covering of the tonsil which comes from the aponeurosis of the muscle a part of the capsule of the tonsil. Poire illustrated that in his textbook. That part is not capsule of the tonsil. The capsule of the tonsil normally is very thin, as may be seen when it is sectioned. It is separated from the other tonsillar tissue by a thin layer of areolar tissue. Toldt's anatomy gives the best description of this. The crypts go right down to this connective tissue sheath. As age increases this sheath thickens; it is also thickened by inflammation.

DR. GEORGE E. SHAMBAUGH, Chicago: I cannot follow Dr. Makuen in tracing the thickness of the capsule of the

tonsil. As I understand it, this thickness increases with age, and the tonsil becomes more and more adherent with age, according to Dr. Makuen's idea. In my experience, this is not the case. I have taken out the tonsil in people of seventy, in whom it is as loosely adherent as in infancy. If there is adherency, it is because there has been a great deal of inflammation, and not because of the physiologic character of the tissue.

DR. HENRY L. SWAIN, New Haven: I have obtained a good deal better idea of what the capsule really means by studying the lingual tonsil than by studying the capsule of the faucial tonsil, especially by studying the follicles, which heap themselves up around the tonsil. The follicles, accumulating around the tonsil, make a complete limiting membrane. If this is taken out it forms an impression or mould in which the tonsil lies. The larger the tonsil the thinner the capsule, and the smaller the tonsil the thicker the capsule. If the tonsil is dissected out in the cadaver, it is found that there is, in a child, a very slight line of demarcation where the covering membrane of the tonsil ends and the posterior pharyngeal wall membrane begins. Young children have very little line of demarcation between the connective tissue on which the tonsil rests and the posterior layer of aponeurosis.

DR. JOHN F. BARNHILL, Indianapolis: Dr. Makuen spoke of splitting the capsule. I could not understand that at the time, but having studied the tonsils which I saved, I can now see how one might speak of splitting the capsule, or, rather, the tissues around it which are removed with the tonsil. I have brought along a large number of these tonsils, which demonstrate, I think, that there is an external capsule which is connected with the deep tissues of the neck, and another which has nothing at all to do with this.

One of the tonsils in this collection, by the way, shows a portion of the styloid process.

DR. LEWIS A. COFFIN, New York City: My conception of the tonsil with its capsule is about that of a tangerine with its peel. The outside skin of the tangerine can be easily removed, without the fibrous covering just over the pulpy part of the tangerine, which is connected with the interfibrillar tissue of the fruit. This fibrous covering, to my mind, is the capsule of the fruit, and not the outside rind. So it is with the tonsil.

If there is repeated inflammation, there will be thickening of the outer capsule.

DR. GREENFIELD SLUDER, St. Louis: I have listened especially for one point which has not been cleared up in the discussion. I have been very much interested in this subject for three or four years, and feel very much gratified that Dr. Makuen should have used the principle of picking up the tonsil, to which I called attention before the laryngological section of the American Medical Association in 1910. The technic was not original with me; it is the technic of Physick, published in 1827. It has been strengthened, but not changed. The point to which I referred, which has not been made clear, is the capsule splitting process. Is there a delimiting membrane which bears the crypts at one end? Is there a fibrous delimiting membrane which covers the posterior constrictor and pillars, or is the crypt open on its lateral aspect, or is it closed by the envelope? (Dr. Makuen answered that it is closed by a very thin membrane.) If that were uniformly the case, this technic would be the ideal method of tonsillectomy; if it be not the case, the turning of the blade across does not remove the last cell of lymphoid tissue. If it does not remove the last cell of lymphoid tissue, it is not a success, because the activity of this lymphoid tissue will bring about a recurrence of the condition for which the operation was performed. Lymphoid tissue will grow up into the wound from the lingual tonsil, developing all the clinical symptoms which the case presented originally. I have seen that happen.

DR. MAKUEN, closing the discussion: Dr. Casselberry has referred to terms and definitions of terms. I used the term intracapsular tonsillectomy chiefly because no distinction has been made between what Dr. Wilson has called the true capsule—and which we all recognize as the true capsule—namely, the thin membrane, and the posterior aponeurosis to which the tonsil becomes so closely attached. The English and French schools of anatomists did not distinguish between these two structures. I use the term intracapsular tonsillectomy because no distinction has been made between the true capsule and this membrane to which it is so closely attached at times that it seems to be a part of the capsule itself. I have found that after mutilation of the tonsils this section of intrapharyngeal aponeurosis is taken out with the tonsil, and it has been

called extracapsular tonsillectomy, where all the capsule has been removed. I object to a sharp instrument because it is so easy to go through this membrane. When you cut through this intrapharyngeal aponeurosis and get the finger down into the loose tissue between that and the muscle, you simply have to tear things out. That is why the finger dissection so rapidly went into disrepute. The finger nail made tears in the muscle which caused great contraction. We all do the same operation and try to get the same results, but the fact remains that we do get deformities in many instances. Someone in New York reported one hundred dissections with eighty per cent of deformities of the palate. We do not all do the beautiful operations which some do, and unless we are very careful we will get these unfortunate results. That is why I have suggested the technic detailed in this paper.

Leucoplakia Buccalis and Lingualis.

BY ROBERT LEVY, M. D.,

DENVER.

This paper is intended to review the bibliography from 1902 to the present time and to offer a critical analysis of opposing views.

The author presents a case as a text. The patient had been under his observation continuously for seven years, during which time the case passed through the various changes incident to leucoplakia. Large papillomatous masses developed and a diagnosis of carcinoma was at one time made, resulting in the extirpation of the lower jaw. Subsequent papilloma and leucoplakia again occurring, doubt was thrown upon the diagnosis of malignancy.

Microphotographs showing the development of papilloma as well as the histology of leucoplakia are presented. The author discusses names, definitions and varieties, etiology, pathology, the frequency of cancer; pathologic manifestations indicating the development of carcinoma, clinical manifestations indicating cancer and treatment.

The author arrives at the following conclusions:

1. Leucoplakia is of special interest because of its doubtful etiology and because of the dispute regarding the question of degeneration into epithelioma.

2. The case reported shows the uncertainty of the diagnosis of malignancy. The most definite clinical appearance cannot always be relied upon.

3. Leucoplakia is a generic term. Excluding syphilitic lesions, it may be considered a pathologic entity.

4. The views of writers who attempt to show the degeneration into cancer are not tenable in the light of our present understanding of the genesis of cancer. Degeneration of existing cells into cancer cells does not take place. A cancer is such from the beginning, and is not caused, only influenced in its development, by irritative lesions.

5. Our understanding of leucoplakia has been confused by attempts to describe a "precancerous stage" or to establish the theory of its "degeneration" into a malignant growth. Leucoplakia may, however, be looked upon as a warning.

6. Certain clinical manifestations may arise which, though not positive, are sufficient to arouse the suspicion of malignancy.

7. The results of treatment are unsatisfactory. Fulguration offers considerable encouragement.

DISCUSSION.

DR. JOHN F. BARNHILL, Indianapolis: During the past year I have had one case of this nature. The patient, a woman thirty-two years of age, had formerly lived in Indiana, but because of tuberculosis had moved to Florida, where she had been living for four or five years. When she came to consult me she had this condition, as diagnosed by a number of physicians, pathologists, bacteriologists, general practitioners and laryngologists. She also had tonsillitis. She would not allow operation because of the tuberculosis. She had been treated by means of X-rays, washes, etc. The mouth got absolutely well, and the patient is much better generally.

DR. THOMAS HUBBARD, Toledo: I have had three cases of this kind. I had a good deal of difficulty in establishing the diagnosis between this and pemphigus. In one case the patient had pemphigus, but the lesions in the throat were not typical pemphigus lesions, and had the case not gone on to typical pemphigus of the skin, the diagnosis would not have been cleared up. In another case this condition occurred in a man who had syphilis. He was a heavy smoker. The third

patient was also a heavy smoker. He smoked from twenty to thirty cigars a day. After one week's cessation of smoking there was a complete disappearance of the lesion. These were typical leucoplakia lesions.

DR. E. FLETCHER INGALS, Chicago: About thirty years ago I reported a case of leucoplakia treated with the cautery, with cure. The lesion was not more than a centimeter in diameter.

DR. EMIL MAYER, New York City: I think leucoplakia is practically always the forerunner of malignant disease. I have under my observation at the present time a patient who, fifteen years ago, showed the first signs of leucoplakia. Within the year he has developed epithelioma. I have seen a number of such cases.

DR. CHARLES W. RICHARDSON, Washington: The cases which I have seen have usually been so extensive that any of the operative measures suggested here or elsewhere would be entirely out of place. In the last case which I had, not only the whole dorsal surface of the tongue, but the buccal cavity as well, was involved. The man had the most intense pain. He has since died. In all probability it would have developed into malignant disease. In some of the cases the dorsum of the tongue, the surface of the hard palate, the under surface of the tongue, and the buccal walls were involved.

DR. D. BRYSON DELAVAN, New York City: Most of the cases which I have seen have become malignant. Any irritative course of treatment is particularly contraindicated. Elimination of the source of irritation, as in tobacco smoking, will result in improvement. In view of the malignant tendency of this condition, it would seem that radium would offer advantages not likely to be realized by the older forms of treatment. Some cases have been subjected to this treatment and have improved under it. I do not know of a case, however—the matter being a recent one—in which a cure is said to have been effected.

DR. LEVY, closing the discussion: The case cited by Dr. Barnhill, of tuberculosis, might have been a case of leucoplakia suffering with tuberculosis. I have never seen a case of leucoplakia caused by tuberculosis, nor do I see how this could be determined. If it were due to tuberculosis, it was certainly remarkable. The fact that it got well is evidence that it was not leucoplakia. Various other skin diseases have

been mentioned in this connection. Dr. Ingals went over the subject very thoroughly in his paper, which was one of the most satisfactory papers ever written concerning this condition.

The question of leucoplakia always terminating in cancer is of course an important one. In the full text of the paper will be found many views pro and con.

The case I reported is an unusual one in view of the extent of the lesion. Other cases quite as extensive have not developed malignancy. It is not necessary for the case to terminate in cancer. The lower jaw, the parotid gland, and the surrounding structures were all removed, yet it was not cancer, as proved by the subsequent history of the case. If we wait long enough we may find cancer developing in the patient who had leucoplakia. Given a case of leucoplakia, however, it is not necessary that it will terminate in cancer. In cancer cases, undoubtedly, it is often possible, by going back far enough, sometimes as far as forty years, to find that the patient had leucoplakia. While cancer may be antedated by leucoplakia in many instances, it is not proved that all cases of leucoplakia will terminate in cancer. Leucoplakia of the tongue is reported by some writers as being more likely than that of other localities to terminate in cancer.

Hyperplastic Sphenoiditis and Its Clinical Relations to the Second, Third, Fourth, Fifth, Sixth and Vidian Nerves and Nasal Ganglion.

BY GREENFIELD SLUDER, M. D.,

ST. LOUIS.

The writer spoke of the body of the sphenoid independent of what cell occupied it, and mentioned the close relations of the above enumerated nerve trunks to its bony wall, and that the size of the cavernous sinus rather than that of the sphenoid cell was what determined some of those relationships. He spoke of the striking difference, clinically, between the nerves in the canals—maxillary and mandibular branches of the fifth and Vidian compared to the third, fourth and sixth, which run through the wide gap of the sphenoidal fissure, the former being a clinical question infinitely more often than the latter. The diagnosis was made from bone removed from the

anterior part of the sphenoid sinus of one hundred and fifty-six cases by Dr. Jonathan Wright, whose microscopic findings corresponded almost uniformly with cases clinically. The slow growing bone increase had for its clinical history long-standing pain and often very slow progressive loss of vision, sometimes only a segment of the optic nerve being involved, the cases of violent headache and rapid loss of vision showing acute osteitis engrafted on the chronic process. The bone sometimes showed periostitis, and sometimes the mucous membrane was normal. The argument was that the clinical picture in the chronic cases arose from narrowing of the bony canals in the process of the hyperplastic bone changes, and that the optic nerve was thereby compressed in the optic canal, producing disc swelling with loss of vision. That the recurrent pain in the second division of the fifth and Vidian—usually diagnostic of migraine—was explained also by narrowing of their confines. In many of the cases these headaches preceded the optic nerve troubles by many years. He attempted to explain this on the score of drainage, the lower part of the sinus usually being bathed in a small amount of thin secretion, whereas the optic and the upper part was not so. He thought the hyperplastic lesion rendered the district more vulnerable, and cited that small areas here become inflamed from unrecognizable origin, and according to their position were more or less disastrous. In the upper outer anterior aspect of the sinus, loss of vision occurred; and in the lower outer and lower middle parts, great pain of maxillary and Vidian distribution, respectively. He raised the question, how lesions of this kind could be bettered by removal of bone for drainage. He did not believe that the primary blood letting of the surgery explained it, and cited a case in argument thereof. He stated that a similar lesion in the anterior nose, where very easily visible, was subject to recessions of longer and shorter duration, and that the condition was apparently helped by judicious surgery. The degree of hyperplasia of the plica septi seemed to be an index of the hyperplastic process in the sphenoid, whereas the degree of hyperplasia of the posterior tip of the middle turbinate seemed an index of a similar condition in the postethmoid.

He appended Dr. Wright's summary upon concluding the examination of the series of specimens.

Headaches Due to Nonsuppurative Intranasal Conditions.

BY GEORGE C. STOUT, M. D.,

PHILADELPHIA.

Headaches of nasal origin, in which suppurative conditions are positively eliminated by macroscopic examination, transillumination, the X-ray, etc., have not occupied a prominent place in our literature heretofore. But, while these headaches are found in a relatively small per cent of the cases who consult the specialist, they are of sufficiently frequent occurrence, and severe enough in their result upon the nervous and mental condition and general health of the patients, to warrant their being considered as a group by themselves.

The pain varies from occasional attacks of moderate degree to frequent seizures of intense agony. It is commonly referred to an area back of a triangle formed by the glabella, the outer canthus of the eye, and the anterior nasal spine. It may also affect the teeth, the neighborhood of the eustachian tubes, or ears, sometimes extending down to the shoulder. It is usually unilateral, but may be bilateral, or occur on both sides alternately. It is not increased by the use of the eyes, though sharp, shooting pains through the eyes are often present. When the pain has existed for a long period the effect upon the patient is deplorable: his general health is undermined, and his mental condition profoundly depressed.

Owing to the very slight departure from normal of the rhinoscopic picture, these cases frequently pass through many skillful hands before the true cause of the pain is recognized. A thorough routine examination of the middle turbinate fossæ should, therefore, be made in all doubtful cases. All the more common causes of headache must be eliminated, such as neurasthenia, eye strain, febrile conditions, syphilis, malaria, digestive disturbances, rheumatism, etc. The absence of pus and the condition of the eye grounds should be ascertained. The general appearance of the lower portion of the nose may be normal, but upon further examination it will be found that, while the middle turbinate itself may be of normal size and coloring, its cavity is narrow and compressed either by the lesser upper (or counter) deviation of the septum, or by a bilateral thickening of the upper portion of the

septum, or by a split septum due to injury. Careful exsanguination of the inferior turbinates and their immediate surroundings only should accurately determine the point of contact. The exsanguination alone may so relieve the existing headache as to prove the chief localizing factor of the cause of the pain.

Treatment should be directed to the middle turbinate itself, and should consist, first, in frequent applications of cocaine, adrenalin and astringents; and, second, as a last resort, the extirpation of a part, or the whole, of the middle turbinate. While the good results of the local applications may be only temporary, the operative procedure usually effects a complete cure of the pain.

The operation may be done under local anesthesia in the phlegmatic patient, but in others the general anesthesia is advisable. As a rule, there is no free bleeding after the operation, and the dressing consists merely in some mild antiseptic powder. The after-treatment consists in keeping the nares wide open and the insufflation of calomel powder every second day.

DISCUSSION OF PAPERS BY DR. SLUDER AND DR. STOUT.

DR. CORNELIUS G. COAKLEY, New York City: I have been discouraged by the migraine type of cases described by Dr. Sluder. I have, however, seen numbers of these patients, sent by ophthalmologists, with varying conditions. In all cases there is a question whether there has been any disease in the posterior sphenoidal and ethmoidal sinuses. None of these cases present typical signs of suppurative disease. Radiographs show nothing, the sinuses always appearing perfectly normal. In most of these cases the ophthalmologist, and also the rhinologist, have gone through all the tests, excluding all the usual causes of the disease to be found in the eye. The statements which have come to me have usually been that the cause of the trouble cannot be found in the nose, and that the etiology cannot be determined. The majority are not likely to get better without some aid. I have probed the sphenoidal sinus—which can be comparatively easily done—and have examined that portion of the sphenoidal mucous membrane which can be reached with the probe, finding it relatively normal. At the request of the ophthalmologist I have

removed the middle turbinate, made a large opening in the sphenoid, and have found normal membrane. I have been astonished at the improvement in most of these cases, although the vision has been bad for two to three weeks, followed by complete recovery.

I have tried to use the Holmes pharyngoscope as described by Dr. Sluder, but I do not see how he gets into the sphenoid so as to make the use of the Holmes pharyngoscope possible. I have been able to examine a little of the roof and floor, some of the posterior wall, and a little of the anterior surface. The great difficulty with all sphenoidal operations is that the orifice becomes very much contracted, so that in the course of six or eight weeks the opening is no larger than normal, and sometimes smaller. If the essayist will tell us how to make an opening that will remain, I will be obliged to him.

Referring to Dr. Stout's paper, I wish merely to say that pressure against the anterior wall does give rise to these symptoms.

DR. JOHN F. BARNHILL, Indianapolis: We see cases over and over, such as Dr. Stout describes, in which removal of the anterior turbinate relieves the condition. Removal of tissue in the nose with no clear indication for doing so is to be deprecated. The matter of diagnosis is of the greatest importance. X-ray and blood examinations should be made, but patients will often not allow it. My greatest source of information has been from the University clinic, where we have advantage of all the channels from which information comes. Sometimes when all the lines of investigation have been followed—X-ray, ophthalmologic, and blood examination—we find appendicitis. I recall three instances of that kind. We may take a line here from our friends, the surgeons, in the far northwest. Nose cases are going to them today, as well as all other classes of cases, because of the tremendous reputation they have for examining patients in every way with the one cost. When we examine them and have all the other examinations made it amounts to hundreds of dollars.

Very often the trouble is not in the nose at all.

DR. HANAU W. LOEB, St. Louis: The merit of Dr. Sluder's paper rests in the determining of trouble in the sphenoid cavity when no pus is present, and discovering the relation of

this trouble to the cranial nerves. This is a good deal to find out in a few years.

Dr. Stout's paper is also important. There are two or three points which will establish the diagnosis in these headaches—headaches in which I operate upon the middle turbinate. They are uniform in character; they attack one side of the nose, one part of the head; they last a more or less definite number of hours, then disappear; they almost invariably appear in the morning and disappear in the evening. As a rule, I refuse to operate unless cocain relieves them, and unless there is some marked process present. It is sometimes the case that I am surprised to find the amount of pathologic process going on when there is no pus. Whether the cause is circulatory or not, I do not know. We have been able to do an immense amount of work in relieving the patient where the anterior turbinate is involved, but we have not been able to do much where the posterior sinus roots are involved. Dr. Sluder's work is important in this regard.

DR. GEORGE A. LELAND, Boston: Not the large amount of pressure, but the continuous pressure, explains some of these cases. This may be illustrated by pressing upon the skin of the hand. It requires only a short time to cause considerable pain, which may not be felt so long as the pressure is exerted, but which manifests itself as soon as the pressure is removed. We have the same condition in the nose. There is a certain amount of soft tissue covering the cartilage. I have seen cases in which a little spicule of bone, sticking out from the septum and pressing upon the second turbinate, will cause pain when, during menstruation, there is an increase of pressure, or when the patient eats too much or drinks too much; and with this increased pressure there is the headache which comes under similar conditions.

DR. WILLIAM E. CASSELBERRY, Chicago: I can confirm the observations of the essayists as to the total absence of pus at times. If pus in the quantity described by Dr. Coakley is considered as an indication of the presence or absence of suppurative sinuitis, I am in accord; but in other cases smaller amounts of pus may occur in one or another of the sinuses, not shown by X-ray examination. But, ad seriatim, taking the antrum, the sphenoid, the ethmoids, I have been able to discover an appreciable quantity of pus or mucopus, which

amounts to the same thing. I am under the conviction that in most of these cases there is a suppurative condition which is at the bottom of the hyperplasia complained of.

DR. JAMES E. LOGAN, Kansas City: I recall one case, in which the headache came periodically in the morning, stopping in the evening. The young man suffered from very extreme headache, beginning about nine o'clock in the morning and stopping about four in the afternoon. He had been operated upon for removal of a portion of the middle turbinate. The headache persisted—nasofrontal headache. I removed the rest of the middle turbinate and opened the duct, thinking pus was there. Very little pus was found. The patient suffered continuously with the headache, which gradually came later in the morning and remained later in the afternoon. Finally, by suction, I got secretion from the nasofrontal duct. This was sent to the pathologist, and it took forty-eight hours to get a culture, which showed a very faint mixed infection, with staphylococcus aureus and streptococcus. An autogenous vaccine was made from this, three injections of which were given, and the patient got well. The same course was followed in another case, and the patient was given relief. Nothing else had given relief. Such cases would seem to indicate, as Dr. Casselberry has just suggested, that the pus is there and can be found if we look for it.

DR. EMIL MAYER, New York City: The amount of pus may be very small in these cases. I recall, in this connection, an experience at Mount Sinai Hospital. The patient, a young man, who had acromegaly, presented a history of persistent headaches. He had high temperature, muttering delirium, and choked disc, and as a result examination of his nose was exceedingly difficult and required skillful dodging. I succeeded, however, in getting a little pus, but said I thought very little could be done for him. The attending physician thought operation was all that could be done, and so I removed the anterior portion of the ethmoid. In twenty-four hours the headache and delirium had cleared up. Some of those in consultation thought I operated at a time when the man was in some sort of crisis. I do not think so. I introduced a probe into the sphenoid and had an X-ray taken. The result was a perfectly clear picture of the probe in the sphenoid, and all then agreed that I was right.

DR. OTTO T. FREER, Chicago: Even very extreme conditions, where there is a sharp crest or ridge very far back in the nose, so rarely cause headache that I have become very skeptical of pressure headaches in general. The whole question is one of reflex. Where we try to remove the effect by the use of cocaine, we are just as much in the dark as we were before. This is, in fact, an open door for all sorts of experimental operations. The patient may be told that it is entirely experimental, the septum is resected, the patient is no better, and still he blames the doctor, no matter how plainly he has tried to impress that the operation is purely experimental.

I agree with Dr. Casselberry about concealed suppuration, but I wish he had been a little more specific as to his method of exploring the sinus. Exploring the sinus through the natural opening is not always satisfactory. I recall a case in which the thin roof of the antrum had been perforated by the canula, the injecting fluid injected into the orbit, and the eye put out. I do not regard washing out the antrum through the natural opening as an entirely safe procedure. The frontal sinus is still more difficult for diagnostic washing. It is sometimes by no means a trifle. In one case which I recall the patient fell over in a convulsion. The fluid could not get out through the small opening, and there was intracranial pressure. One thing that gives an indication of concealed infection is the complaint by the patient of a discharge running back into the throat. A perfectly healthy sphenoid and infundibular region usually does not go with diseased ethmoid. Something must be there to give us a hint. The nerve most often affected, in my experience, is the anterior ethmoidal, which is a very sensitive nerve, as Killian has shown.

DR. CASSELBERRY, continuing the discussion: In a recent issue of the *London Journal of Laryngology, Rhinology and Otology*, Kelly, of Glasgow, records no less than thirty cases of bad results from exploratory puncture by the penetration of the antrum. The one Dr. Freer mentions is the first I have heard of in an attempt to irrigate the antrum through the natural opening. When he puts in the canula and penetrates the orbital plate he is not irrigating through the natural opening. The canula with which I irrigate through the natural opening is very thin, reasonably thicker where I hold it, having more than a right angle turn at the bend, and not exceeding more

than from one to two millimeters in length. Properly introduced, it will serve for the irrigation of the antrum through the natural opening, which can be accomplished safely in the majority of instances. The stopcocks must be arranged and the air pressure regulated. Not more than ten pounds pressure should be used to begin with, otherwise harm will be done. This is run up as the operation proceeds. The same thing is true of all the other sinuses.

DR. J. GORDON WILSON, Chicago: Dr. Sluder's paper is extremely interesting and suggestive. It does not mean that there may not be disease of the sinuses without suppuration. That depends, of course, upon what we mean by without suppuration. There may be hyperplasia of any sinus without any suppuration at all. Some years ago I did some work in the way of putting capsules into the sinus, having introduced into these capsules different forms of bacteria. The capsules were so arranged that the bacteria would not come out, but their toxins would. There was hyperplasia in these cases. I used drugs for these experiments, some of which were kept alive for several weeks. I have often wondered how infection passes along these nerve trunks. I suggest, as quite possible, that there may be absorption of the toxins from the lymphatics into these nerve trunks.

DR. SLUDER, closing the discussion: Answering Dr. Coakley's question about the method of operating: The outlet and the sinus itself must be large enough to permit of the use of the pharyngoscope. I use a right-angled knife. The posterior part of the cribriform plate and the posterior and uppermost aspect of the olfactory plate are approached, the sphenoid sinus or one of the misplaced ethmoidal cells being punctured by such a stroke. As soon as the cell is punctured the stroke is directed downward, forward, and inward. The septum is cut down to the floor of the sphenoid. The knife is then introduced carefully along the cribriform plate. Again the uppermost posterior aspect of the olfactory plate is approached. The knife is then turned at an angle of forty-five degrees, and downward and outward. This, on the cadaver, has been proved to throw the posterior ethmoidal labyrinth pretty thoroughly open every time. By means of the pharyngoscope it is found that there are two very satisfactory openings into the posterior ethmoidal cell, and sometimes the

sphenoidal. Sometimes it is possible to get it all out in that way. Dr. Wright has one such specimen, measuring a half inch in diameter.

Dr. Coakley spoke of being unable to get good observation with the pharyngoscope. I always operate under cocain. I uniformly refuse to operate upon these patients except under cocain. I give them scopolamin first. The primary stroke is sufficient to produce enough shock, and at the same time to prevent the wound from bleeding. With the pharyngoscope close at hand it can be passed in. The patient may faint; let him faint. The wound for a time does not bleed.

I have some cases in which the opening staid open for five or six years. I have never seen membranous closure, as suggested by Dr. Bryan, but I have seen bony closure, as suggested by Dr. Coakley.

Dr. Loeb spoke of congestion in the sinus, which he thought more responsible than the vacuum of which I spoke. Politization will stop the trouble. The congestion is the result of the vacuum.

Dr. Leland has given a valuable point about the little pressure of long standing.

I have tried vaccines repeatedly, as suggested by Dr. Logan, but have not gotten the results.

Dr. Mayer spoke of crises and the use of ergot. In my text I brought out, partly as a matter of speculation, that there is in some canals a considerable pad of fat; in the optic canal there is exceedingly little. If this hyperplastic process narrows the canal and this pressure is maintained for a considerable time, nature's shock absorber is used up. Sometimes a trifling indigestion will start up the trouble, just as sometimes a trifling thing will diminish the vision. If ergot is given when there is this congestion, it will contract the tissues and relieve the headache.

DR. STOUT, closing the discussion: I merely wish to say, with reference to Dr. Casselberry's remarks, that I distinctly said there was apparently no pus.

The Effects of Radioactivity Upon Nasopharyngeal Fibroma.

BY D. BRYSON DELAVAN, M. D.,

NEW YORK CITY.

The conditions due to the presence of this growth are usually so urgent as to demand relief.

For this three varieties of treatment have thus far been practiced:

1. Removal of the tumor after preliminary operation done for the removal of obstructing parts.

2. Removal through the natural passages by evulsion or with the cold snare.

3. The reduction of the size and the vascularity of the tumor by electrolysis or by the injection of various chemicals, followed by the removal of the remaining mass by means of the galvanocautic loop.

Of these methods the first is illogical, unsurgical, and, as experience has abundantly proved, deadly; shock from the preliminary operation is severe, hemorrhage profuse, and if the patient survive, deformity from the preliminary operation is serious and recurrence of the growth common.

The second method is much better than the first, but may provoke serious hemorrhage and shock, and is apt to be followed by recurrence.

The third method is by far the best. Although tedious and sometimes painful and requiring considerable skill, statistical comparison shows that of twenty-seven cases removed after severe preliminary operation in which end results were given, fifty-nine per cent were reported "cured" and twenty-six per cent died. Of forty-one cases removed through the natural passages by evulsion or the cold snare, five per cent died; and of sixty-six cases by electrical methods, one hundred per cent were cured.

Much attention has of late been given to the treatment of uterine and other fibromata by means of the X-ray and of radium, and both in the United States and in Europe the apparent success attained renders the method worthy of consideration. The similarity of type between the uterine and pharyngeal growths at once attracts the attention of the laryngologist to the new treatment.

Fibromata of the nasopharynx are relatively much smaller and more directly accessible.

The complete reduction of the nasopharyngeal growth might not be essential, since it tends to diminish spontaneously after adolescence and finally disappears. If its growth could be controlled during the earlier years and until after the period of its activity, nature would in some cases at least intervene to effect a cure. Cases of slow development occurring in older rather than younger patients would offer the best prognosis. Judging from the effects of radium in other cases, its action would be active and profound; more may reasonably be expected from it than a moderate reduction in size.

Dr. Robert Abbe, pioneer in the use of radium in the United States, has originated many ingenious devices for its application to various organs of the body, and especially for its use in the nasal and nasopharyngeal region.

In the application of the radium, the parts to be treated must be exposed to the rays, and the healthy surrounding parts must be protected from them. It is not necessary that the radium should be introduced bodily into the substance of the growth, as the blood vessels of the growth are more abundant near its surface, and as the rays penetrate at least a quarter of an inch, the treatment is entirely effective in profoundly influencing the circulation, and thus, as well as by its effect upon the connective tissue of the organ, causing a reduction of its size. Proper regulation of the strength of the radium and the duration of the exposure will prevent injury to the surrounding healthy parts. Should the radium treatment prove as valuable as it promises, the world may be congratulated that the unhappy record of past surgical failure will have been closed.

DISCUSSION.

DR. CORNELIUS G. COAKLEY, New York City: Dr. Francis Carter Wood has been experimenting, as all know, on various animal colonies with radium; he has also done some clinical work with this agent. He has been kind enough to use it in several cases which I have sent him during the past year and a half. In a case of epithelioma of the nose, radium had a very favorable effect. The patient had a bad case of arteriosclerosis and died from cardiac trouble. All trace of the epithelioma had disappeared. Several cases of papilloma of

the larynx were cured by radium. In one case the papilloma had existed from early childhood to the age of forty or more. In another case treated by him there was an angiofibroma which completely filled the nasal cavity, the mass being visible without a nasal speculum. He used eighteen milligrams in a very small glass tube wrapped in ordinary adhesive tape. This was thrust into the nose, and was followed by profuse bleeding. At the end of two weeks no change in the mass could be noted. For some reason the boy did not return to the clinic for eight or ten days, and when he returned it was found that the mass had decreased in size. A brass capsule containing eighty-three milligrams of radium was then inserted, the posterior end of this tube extending into the posterior nasopharynx. This was left in for twenty-four hours. The excoriation all around the face was simply remarkable. No X-ray burn ever compared with this burn. Dr. Wood told me I need not worry about it, as it would diasppear, which it did. The radium was applied in February, and the inside has not completely healed. The patient can breathe through the nose, however, and it is possible to look right through into the nasopharynx. The mass is attached to the posterior wall of the nares and apparently somewhere in the posterior ethmoidal region on the left side. Since the radium has been used the hemorrhages which the patient had at irregular intervals have almost entirely ceased. The radium is pretty apt to cure this fibroma. A smaller dose in this case would probably have been better.

DR. OTTO T. FREER, Chicago: I have used radium, but not in the treatment of fibroma. We have at our command a means which we did not have a few years ago. I have removed a very large fibromata, with a keen knife, from behind, after having injected directly into the growth a double dose of pituitary extract, two ampullæ, followed by adrenalin. The hemorrhage did not exsanguinate the patient. There has been one recurrence since.

Would not the combination of surgery with radium be less tedious and more satisfactory than radium alone in the removal of fibroma that enters all the cavities?

I was interested in the recovery which Dr. Coakley reported. Dr. Frank Dudley Simpson, of Chicago, who has employed it so extensively, says he has never had a recovery.

I would like to ask Dr. Coakley how long after the use of the radium the burn appeared, and how long the radium was used.

DR. COAKLEY, continuing the discussion: This is not the only burn which has come under my observation. I recall a case treated by Kelly, in which there was a most terrific burn, resulting in extensive infiltration and suppuration. That was a year ago last December. There was a recurrence of the epithelioma of the larynx, and the patient went down some time in March for further treatment. The radium was used without external reaction, but with such extensive internal reaction, with swelling of the arytenoid folds and aryepiglottic tissues, that it was almost necessary to do a tracheotomy.

In the case I cited, the boy had had no treatment for a week, when superficial ulceration appeared all over the skin of the nose and cheek. It was extraordinarily painful. The pain following the use of radium is what patients object to. There is no question of its activity.

DR. DELAVAN, closing the discussion: I cannot conceal my great satisfaction with regard to the cases which Dr. Coakley has presented. I have been studying this matter of nasopharyngeal fibroma ever since I was an undergraduate student. I have seen the best surgeons take these cases and end with very unsatisfactory results. Statistics show that surgical procedures of any kind are dangerous. Evulsion, removal with a snare, and other methods, may be followed by hemorrhage. As far as I can compile statistics on the subject, there are five deaths in a hundred, as the result of shock or hemorrhage. There is always the danger of recurrence. The application of radium requires a certain amount of skill, but no surgical skill.

SYMPOSIUM.

THE CONSIDERATION OF PANSINUITIS EXCLUSIVE OF EXTERNAL OPERATIONS.

The Etiology of Pansinuitis.

BY J. GORDON WILSON, M. D.,

CHICAGO.

There are local anatomic and physiologic factors which explain why pansinuitis does not occur more frequently, factors which when they are defective or destroyed lead to its occur-

rence and persistence. Of great importance are the ciliated cells and the lymphatic system. The action of the cilia and the arrangement of the lymphatics are such that in each sinus there is an independent anatomic and physiologic mechanism of simple type, adapted to free the cavities from such local irritants as may arise during the normal life of the cells which line it, or may accidentally invade the sinus during respiration; and an isolated lymph system giving protection against microbial invasion. On the other hand, the vasomotor mechanism is common to all.

During a rhinitis, as the local inflammation subsides the congestion in the sinus disappears, the cilia rapidly recover, and the exudate which is not absorbed is cast out by the cilia movements, and the sinus recovers. If, however, the inflammation be so acute that the physiologic protectors and barriers are interfered with or no longer effective, the morbid processes are different. The result is an interference of ciliary action and a lymphatic stasis. In chronic pansinusitis the same processes are at work interfering with the removal of secretion, producing a lymph stasis and finally a bacterial invasion. Other factors may influence these processes, as, for example, narrowing or obstruction of the ostia or nasal cavity from mechanical causes; disease in the adjacent part of the nasal cavity which has resulted in destruction of the cilia; scar tissue, or tissue devoid of cilia, either from disease or from a nasal operation.

The chronic turgescence may be so gradual in onset as never to awaken suspicion. It may be so slight that it is beyond our diagnostic ken. It may be so slight that bacterial activities and toxin effects are counterbalanced by tissue activities or antibodies within the limits of health. In such cases a slight increase in congestion may be enough to disturb the balance; or debilitating diseases and hematogenous infections set up a pansinusitis.

The writer sketched briefly the organisms found. He believed that the organism is most often an invader into an already damaged sinus. Since the same morphologic organism can vary so much in its virulence, until we know more about the cause of this variation we are not likely to get far in considering its etiologic significance.

A healthy sinus has great protective power against bacterial

invasion and great recuperative power after the simple hyperemias which occur during a rhinitis. We have the potentialities of a pansinusitis in the chronic rhinitis with its constant or recurring circulatory disturbances, vascular and lymphatic, with the risk of excessive accumulation of foreign exudate, and a nasal cavity more or less infected.

The disturbance resulting from the first is such that there follows the failure of the second, which inevitably leads to the invasion of bacteria. It is well to remember the possibility of an accessory sinus being charged by the products of a low-grade inflammation which apparently show little or no local effects. The wise treatment will recognize why nature has broken down and aim as far as possible at compensation. It will aim at not leaving any one sinus so impaired that it acts as a source of danger. To replace epithelium in a dependent cavity by scar tissue is to replace it by tissue with no physiologic action. I cannot conceive of a healthy antrum ever existing after extensive curettement.

The teaching of nature is obvious. The mucous membrane of the accessory sinus is doing important work. We may aid by reducing chronic vascular and lymphatic engorgement. We may aid by assisting in the removal of excess of secretion. But if we do so at the expense of permanent damage to the ciliated walls, we may well go slow, and ask what compensation we offer for this loss.

The Nonoperative Treatment of the Accessory Sinuses.

By LEWIS A. COFFIN, M. D.,

NEW YORK CITY.

The writer has ceased to think of the cure of the diseases of the accessory cavities of the nose by either operative or non-operative procedure, and is satisfied when he has accomplished a result sufficient that he may consider it as arrested.

Negative pressure in conjunction with autogenous vaccination has been followed by very satisfactory results.

By means of his special apparatus the writer applies suction, drawing mucus from the cavities, using in special instances a canula connected with the suction apparatus; following this, air is made to enter the vacuumized cavities under

considerable pressure, medicated by a nebula of oil variously laden with remedial agents.

By using autogenous vaccines in conjunction with this procedure he has been able in two chronic cases to cause an entire cessation of discharge, in which suction alone in conjunction with the vaccines had failed entirely.

The negative pressure should be started low and gradually increased, while the nebula is thrown into the nose under a pressure of ten to fifteen pounds.

For medication he uses either an oil loaded with Bulgarian bacilli or an iodine preparation. A description of the apparatus followed.

Observations Upon the Intranasal Exenteration of the Ethmoidal Labyrinth in Pansinitis.

BY HARRIS P. MOSHER, M. D.,

BOSTON.

The speaker detailed the fundamental points in the anatomy of the ethmoidal labyrinth, describing the anterior cells, the nasofrontal duct, the unciform cell, the posterior ethmoidal cells and the superior nasal spine.

After mentioning Hajek's and Ballenger's operation, he then described his own method, as follows:

The anterior end of the middle turbinate is first removed. The initial plunge of the curette into the ethmoidal labyrinth is best made by disregarding the agger nasi cell if it is present and going higher on the superior overhang—that is, the extreme upper part of the middle turbinate and a little further backward. If the curette does not readily break into the labyrinth, it should be carried a little higher and a little further back. Finding this point may bother the beginner. Once in the labyrinth the curette is turned and swept forward until it strikes the posterior surface of the ascending process of the superior maxilla. Then it is turned so that it faces posteriorly, and by backward and downward sweeps the unciform process, the ethmoidal bulla and its cells are opened. The cavity so made in the anterior part of the ethmoidal labyrinth is cleared of fragments by using a small round tonsil punch. The operator is now ready to probe for the nasofrontal duct and to enlarge it by sounds, rasps and bur.

In a great majority of instances the ascending process of the superior maxilla is a guide to the nasofrontal duct so that a probe slipped upward along its posterior border finds the sinus. In the small percentage of cases where this fails the duct can be found by carrying the probe backward to the limit of the roof of the operated cavity and then bringing it forward with the point turned outward. Only as a last resort should the point be turned inward.

The second part of the operation: The head of the patient is held so that the cribriform plate is level, and it is kept so. The curette is now plunged through the attachment of the middle turbinate and carried backward to the outside of the middle and superior turbinates to the front wall of the sphenoidal sinus. This is firm and stops the instrument with a dull and sometimes with a sickening thud. The face of the curette is now turned downward and the bowl and shaft forced through the bottom of the ethmoidal labyrinth. This generally leaves the posterior half of the middle turbinate dislocated and hanging. The middle is removed by snare or conchotome.

The lower two-thirds of the inner wall have now been removed. The upper third of this wall is left as a prominent anteroposterior ridge, composed in front of the middle turbinate and behind of the superior turbinate. As much of the turbinate ridge as possible should be removed. The amount of the ridge left at the end of the operation determines the thoroughness of the exenteration. Whenever there is an appreciable ridge left there is a chance to remove the inner wall of one or more of the posterior cells. It is especially important to get this remaining portion of the inner wall of the labyrinth removed posteriorly, in order to do away with the inward bulging of the labyrinth which so obscures the nasal face of the front wall of the sphenoidal sinus. For this purpose the round tonsil punch is very convenient. The sinus is now evulsed or laid bare as needed. Finally, the inner surface of the os planum is curetted from behind forward. Packing over night is advisable.

The writer does not consider that an ethmoidal case is ever free from the liability of a recurrence.

While the writer has had no deaths, such have been recorded, and there is always danger in ethmoidal operating.

The method of removal of the nasal spine appeals to the

writer, provided the anterior ethmoidal cells are dealt with at the same time.

In all chronic cases of antral disease the writer prefers opening the canine fossa to the intranasal route.

The Frontal Sinus—Opening it Through the Nose.

BY OTTO T. FREER, M. D.,

CHICAGO.

The intranasal frontal sinus operation has been developed in the last ten years, and principally by E. F. Ingals, Max Halle, Segura, Vacher, H. P. Mosher, P. Watson Williams and Herbert Tilley. Freer's article is based upon their work and original observations.

Anatomy.—The frontal sinus outlet or ostium is bounded in front by the crista nasalis interna, internally by the expanded portion of the anterior superior nasal spine of the frontal bone, externally by ethmoid cells lying between the ostium and the lacrimal bone, posteriorly by the anterior ethmoidal cells, which extend from the ostium posteriorly underneath the orbital process of the frontal bone and are completed and roofed by it. Removal of the ethmoidal cells thus forming the portion of the sinus floor behind and external to the ostium gives a space for drainage greater than that created by cutting away the internal nasal crest forward with rasp or bur, while the opening is more likely to remain permanent. It may, however, be necessary to cut away both the cells and the crest to open the sinus sufficiently.

The Operation.—This usually begins with the severing of the anterior attachment of the middle turbinate or with resection of its anterior half, if necessary. In some cases a projecting middle turbinate may be left intact. If needed the unciniate process is next cut away with the Freer sharp septum elevators to expose the bulla ethmoidalis fully to view. With a ring curette whose edge is directed forward and obliquely upward and inward against the bottom of the bulla, the bulla is entered and the curette is made to sweep away the anterior ethmoid cells from the bulla forward and upward to the ascending process of the superior maxillary bone, and, if possible, to the sinus floor, breaking through the latter and

entering the sinus behind the crista nasalis interna. If the sinus floor prove too hard to give way to the curette, an especially devised probe curette is passed through the sinus ostium after the way through it has been found by an ordinary probe, and the probe curette is made to cut its way out of the sinus through the ethmoid cells under the orbital plate of the frontal bone, thus enlarging the ostium posteriorly so that a larger curette of the same form may be passed up into the sinus to clear away all of the cell remnants under the orbital plate and in the pathway down into the nose from the sinus, this pathway lying between the lamina papyracea of the ethmoid bone and its turbinal wall. If necessary the ostium is enlarged forward also with a straight bur driven by the dental engine. The preference is, however, given to posterior enlargement because of the tendency to the postoperative formation of obstructing cicatrices in the region of the crista nasalis interna.

It is unsafe to curette inward in enlarging the frontal sinus ostium, as there is danger of entering the cranial cavity through the wall of the fossa olfactoria, especially if a torus olfactorius, as described by L. Onodi, exists.

In cases where the suppuration continues in marked degree after the intranasal operation, while the sinus remains open for intranasal drainage, the external operation must be resorted to. Where great swelling of the lid, exophthalmos or cerebral symptoms indicate the existence of caries of the sinus wall and progress of the disease beyond it in the form of sinusitis frontalis exulcerans (Killian), the intranasal operation should not be attempted.

Explanatory illustrations accompany Dr. Freer's article.

Two Cases of Chronic Pansinusitis Associated With Systemic Infection.

By GEORGE E. SHAMBAUGH, M. D.,

CHICAGO.

Both cases occurred in young women. One case was caused by a diseased tooth; the cause of the other case is not clear. In both, every accessory sinus on both sides was involved. Intranasal operations succeeded in curing the infection in all the sinuses except the frontal sinuses in one case, while in the

other even the frontal sinuses are apparently healed. In one case an attack of acute articular rheumatism occurred, apparently from the focus in the sinuses. The opening of a large posterior ethmoid cell and the neighboring sphenoid sinus was followed by a disappearance of the rheumatism. In the other case a severe chronic arthritis, involving every joint in the body, occurred as the result of a severe acute articular rheumatism which followed an acute exacerbation of the long-standing sinusitis. This case was subject to recurring attacks of acute exacerbations, associated with fever and increased pain in the joints, until by persistent efforts apparently the last focus of pus in the sinuses was drained. Since the sinusitis has been cured there has been an absence of acute exacerbations, but the inflammatory process in the joints is undergoing fibrous changes, resulting in increased rigidity of the joints.

DISCUSSION ON SYMPOSIUM ON PANSINUITIS.

DR. HARMON SMITH, New York City: I have here an instrument which bears on the treatment of the conditions under discussion. It works along the line of creating a vacuum, and, while there is a vacuum, lactic acid bacilli are injected. The syringe is loaded with lactic acid bacilli in a solution of argyrol, enzymol, or any other preparation. By means of the syringe the solution is forced into the sinus. A bicycle pump may be employed to create the vacuum. The instrument can be used at home, and should be employed two or three times a day. Subacute and chronic cases have all improved under this method of treatment.

DR. THOMAS HUBBARD, Toledo: Referring to Dr. Coffin's method, I have one criticism to offer concerning the actual amount of negative pressure used. The statement that he used so many pounds of negative pressure is absolutely incorrect, because the mucosa will stand not more than four or five pounds. This can be determined exactly if measured by a manometer. Three or four pounds is my experience. There is more or less hemorrhage from five pounds of negative pressure.

DR. HENRY L. SWAIN, New Haven, Conn.: The idea of Dr. Wilson's paper is in line with what I have always held. If the ciliated membrane of the cells can be preserved, better

results will be obtained than would otherwise be possible. The less the traumatism the better.

I had the pleasure of seeing two of the cases mentioned by Dr. Coffin, and the exhibition of the method on the patient. I learned a great deal from the demonstration. I saw him treat a man into whose nose I could easily see. The patient had lost his septum and it was possible to see into the sphenoid sinus. Everything was very open and apparently clear. I could see no secretion at all, yet Dr. Coffin got out a tube half full of secretion. It was not only serous matter, but pus as well, and was colored with iodine which had been introduced two or three days before. In the case of the woman there was some pus along the floor. This was all sucked out. At the present time the right side of the face transilluminates better than the left. The effect of the Bulgarian bacillus will be proved by time. The applicability of the apparatus has been demonstrated.

I was called upon to treat a case of acute antrum disease in a man who had a round opening in his septum. By going in on the opposite side I could use small tubes or probes, and could flush out the antrum through the natural opening. I could look in through one nostril, put the tube in, and flush out perfectly well.

DR. JOHN F. BARNHILL, Indianapolis: Two years ago I saw Dr. Mosher's specimens and his method of operating at that time, and I have employed the method since, with very good results. The limitations can be well marked out, and that is what makes Dr. Mosher's method safer than some of the others. The Ballenger operation is dangerous unless the bone is soft. Where the bone has been softened by the polypoid masses, and where the cells are filled with polypi, the Ballenger method is excellent. Until the posterior retaining wall is reached the operator is within the field of safety. So, then, we are working within a bony capsule, the limitations of which, unless too diseased, will give the sensation of where we are working. In the absence of these limitations the Ballenger knife is useful.

DR. CHARLES W. RICHARDSON, Washington: In the Mosher operation I have met with one complication, which I am surprised that others have not met—the possibility of entering

the antrum. There is danger unless one is very cautious in making the downward stroke.

DR. E. FLETCHER INGALS, Chicago: The Mosher operation for the ethmoid seems to me in every way desirable. However, it has not appealed to me to leave the middle turbinated body until the end, unless the posterior cells are also involved. I prefer to take off the anterior portion of the middle turbinate, as it gives a better view. In acute cases of frontal sinusitis the Mosher method is admirable for opening up the sinus.

The intranasal method of opening the frontal sinus which I devised several years ago has answered my purpose better than any of the methods described, giving ninety per cent better results in chronic suppurative frontal sinusitis. In acute cases I cannot get the probe in. The instrument which I use is six millimeters in diameter. I have had four or five cases in which I could not pass it the whole distance. I would get in half way, and be unable to go farther; I would then pass in the bur. The probe prevents one from doing any harm. If it is merely the frontal sinus that is diseased, this method gives all the opening that is necessary. In ninety per cent of the cases the patients get well just as rapidly as they would from any of the more severe operations. There is no use, as a rule, in making an opening of more than two millimeters in diameter.

DR. LEWIS A. COFFIN, New York City: I employ a method modified somewhat after that of Mosher. He goes in with a curette, I go in with a chisel. I know by a slight tap whether I am on solid ground. There is a big safety space of about half an inch. I make an up-and-down incision with the chisel, then bear upward toward the median line, and at that point introduce Luc's forceps. I take out all I can. Three bites and I am looking into the sphenoid. There is very little hemorrhage; I have never had to pack a case. It may be necessary to clean up with angular forceps and curette, but to me this is the easiest way.

DR. WILLIAM E. CASSELBERRY, Chicago: In the earlier years I employed the Hajek method; of late I have adopted various methods. I have followed Mosher's plan, and I have used Coffin's method, except that in all these methods I first remove the anterior end of the middle turbinated body. That which

is left of the turbinal is sufficient as a guide, without having the anterior end in the line of the light and shutting off the view. It has been stated by Watson Williams and others that the upper wall is so rich in lymphatics and blood vessels that there is danger of the communication of sepsis to the brain. That statement has deterred me several times from making my operation as complete and thorough as I wanted to make it in order to enter the sphenoid. I have also found this turbinal plate very hard and difficult to get through. In certain instances I have felt it almost impossible to get down on a level with the sphenoid wall in order to do the classical Hajek operation and the Mosher operation. I have thus been obliged to leave quite a ridge projecting down.

DR. WILSON, closing the discussion: We do not know much about the lymphatics of the upper part of the nose; most of our knowledge is theoretic. If we inject the subarachnoid space of the brain we can pass dye into the olfactory nerve. We know that the olfactory nerve is surrounded by lymphatics, but we do not know that by injuring the olfactory nerve we will communicate sepsis to the brain. Anatomists teach that it is dangerous to subject the olfactory nerves which come out from the cribriform plate to injury; further than that they do not know.

DR. COFFIN, closing the discussion: Answering Dr. Hubbard's remarks about the amount of pressure: the gauge is graduated, but how I do not know.

DR. MOSHER, closing the discussion: I am sorry to have added to the nomenclature, but the term *agger nasi* seems to me to be better for the cell at the ensiform curve than lacrimal or infundibular.

The selection of a method of operating upon the ethmoidal labyrinth is a personal matter. The danger of working in the extreme upper and anterior part of the middle turbinal has been mentioned by Watson Williams, and also by Freer. The higher one goes the greater the danger. Two patients died from meningitis, as I said in the paper.

I do not see why the rasp is more dangerous than the bur.

For the last year I have removed the anterior end of the middle turbinal, as a routine procedure.

As to opening the antrum, as suggested by Dr. Richardson: The amount of overhang varies greatly. In extreme cases

the overhang in front is great. In many cases of frontal sinusitis the antrum is already infected. One also runs the risk of infecting it by taking off the unciform process, as the inner wall of the antrum is opened as soon as this is removed.

DR. OTTO T. FREER, Chicago: Quite a number of years ago Holbrook Curtis gave a description of an intranasal antrum operation in which he used trephine and bur. I modified this operation. In the course of ten years I have had unvarying success in opening with the trephine and bur. I have had complete recovery in some sixty cases of antral suppuration. Most of them got well as soon as there was an opening in the lower meatus. It is not always necessary to resect the anterior turbinated body. The trouble with the Ingals operation is that you get a beautiful opening at first, with a tendency to contraction. Whether I use the Ingals bur or another method, I think his tube may be a valuable aid in keeping an opening.

Referring to Hajek's operation, it cannot be denied that he has done a large amount of work since 1905. He has enough cases now to speak authoritatively. He has another flap operation which should be studied. He objects to the rasp on account of the danger of breaking down everything and inducing meningitis. He works with a bur, which I have used and have found to be a safe instrument. Hajek is absolutely right in regard to his bur. The cutting forward is apt to be followed by contraction. I did not object to the term *agger nasi* cell, but I did object to the term *uncinate* cell.

DR. GEORGE E. SHAMBAUGH, Chicago: The question raised by Dr. Casselberry with reference to the danger of setting up meningitis holds if the wrong method is followed in operating upon the ethmoid. Taking the whole mesial plate of the ethmoid, and pulling and tearing off pieces, will lead to extension which will eventuate in meningitis. That should be left alone, and work be confined to the labyrinth. The labyrinth itself has no communication with the intradural space.

As to the use of the rasp: I do not push and pull down, but use it gently. Used properly, it is not a dangerous instrument.

It is unfortunate when everybody tries to use different terms for the same anatomic structure. Most anatomic terms are fixed by the anatomic nomenclature. The term "infundi-

bulum" is used incorrectly. "Infundibulum ethmoidalæ" is the term used by the Nomenclature Congress at Basle.

Another term which we have been using wrongly throughout this discussion is the synonym for inflammation of the sinus—"sinuitis," which has been incorrectly called "sinusitis." We might as well get into the habit of using correct terms.

Tonsillectomy in the Adult—Are We Justified in Doing so Many Indiscriminate Tonsillectomies for Remote Infections?

By CHARLES W. RICHARDSON, M. D.,

WASHINGTON, D. C.

The paper deals with the ingrained feeling in the profession that the tonsils are probably the sole focal source of general infection. This view has extended not only into the general profession, but has also become an obsession of the laity, so that there are a great many cases of tonsillectomy which are operated upon, in all probability, with an imperfect study of the cases, and the want of proper realization of the relation of causes and effect.

He also called attention to the number of other focal sources of general infection. He stated that there was no question of the necessity of tonsillectomy in a certain class of cases, where there was decided preexisting or present evidence of local disease. He doubted that there was any necessity of removing the tonsils, except in unusual cases where there was no evidence of disease or tenderness or hypertrophy, wherein there was general infection, simply for the purpose of correcting such a condition. Dr. Richardson also disapproved of the removal of tonsils wherein there was simply the history of a previously existing case of tonsillitis preceding general infection, and wherein the tonsils seemed absolutely normal at subsequent inspections. A number of cases were given to bear out these contentions.

DISCUSSION.

DR. HENRY L. SWAIN, New Haven: The ideal way is for the general practitioner to send patients to us to ask if the tonsils should be removed, but most of us are confronted with the exactly opposite condition. The nurse, the relatives, or others will send a patient to the hospital "to have the ton-

sils removed." Some tonsils certainly do not need to be removed. Tonsillectomy is undoubtedly performed in many cases in which it is not needed; that is wrong. Any method which will lead to some way of estimating quickly and accurately as to whether a tonsil should or should not come out would be of tremendous advantage.

DR. G. HUDSON MAKUEN, Philadelphia: I have had several letters from Dr. French concerning his work. He promises to bring this subject before us at our next meeting in Washington. He is now able to tell whether or not a tonsil is diseased. He thinks he will be able to look in the mouth and tell whether or not pus or detritus of any sort is there, and whether or not it should be removed. It is not a question of whether or not the tonsil should be removed, but what should be done; it is a question of the prevention of the trouble, just as the prevention of sinusitis is advocated. The cases of which I am proudest are those in which I have done the least operation. When pus is found in the crypt it is possible to cauterize the edges of the crypt, to open and drain, without trying to do an extracapsular, intracapsular or any other kind of an operation for tonsillectomy. Some of these cases are inoperable, and it is far better to give good drainage and to remove the possibility of infection. I think that can be done in a great many cases, and radical surgery thus be avoided.

DR. WILLIAM E. CASSELBERRY, Chicago: I cannot say that I feel thoroughly in sympathy with the point of view presented. It goes without saying that we should not remove tonsils which we are sure are healthy and which will not give rise to systemic infection. It goes equally without saying that we should remove those which are harmful. I am unable to assure the internist that the tonsils are not the source of systemic infection, even after I have evulsed the pillars and have explored every repository of infection, because the tonsil is a sponge, and may be still the source of infection after such exploration. Many times when the internist sends us a patient for examination of the tonsil, and we find no infection there, we should look elsewhere for the source of the trouble; we should look above. There are ten cavities just above. Sinus suppuration is exceedingly common, and is not infrequently the primary source of infection in the tonsil itself. If we remove the tonsil we are still not sure that we have re-

moved the source of infection. Our duty to the internist is to find the source of infection if it is not in the tonsil.

DR. THOMAS HUBBARD, Toledo: Dr. Casselberry's remarks about finding the source of infection applies to the teeth. Given a case of some form of systemic infection, probably of focal origin, it will be our first duty to prove that the tonsil is or is not diseased, and then to find the real source. The method followed is extremely interesting. Dr. Price of Cleveland is able to study the condition of the peridental tissues, and, by culture of the various bacteria obtained, to tell the influence upon the system. In this way he has been able to exclude certain teeth and to find the diseased root which is the source of the active organism. In doubtful cases, where there is objection to operation, we should be able, by some such method, to tell whether the tonsil is the source of infection.

DR. HANAU W. LOEB, St. Louis: It is easy enough to exclude the teeth, or pyorrhea, or a small abscess at the roots; but it is not easy to tell when the tonsil is at fault. In a case of rheumatoid arthritis, getting worse for one, two, or three years, in which repeated examination revealed nothing, and in which the tonsils are not specially large, would you leave those tonsils? I have recently had such a case of rheumatoid arthritis, examined by various internists without result. I removed the tonsils, made a vaccine after the method of Rosenau, used it, and the patient got better immediately. Because the danger of increasing the pathologic process by a single attack of mild tonsillitis is so great, I think we are justified in removing the tonsils, providing, of course, the age and the general condition of the patient permit. While we should not remove tonsils indiscriminately, in the presence of disease which cannot be otherwise located we are justified in removing them.

The appendix and the tonsil are very closely related as to structure. The fact that removal of the appendix was followed by cure of the rheumatoid arthritis does not necessarily mean that the tonsils should not be removed.

DR. JAMES E. LOGAN, Kansas City: Nothing has been said of one source of infection which to my mind is very important—the vault of the pharynx. I think many infections come from failure to appreciate a condition in the vault of the

pharynx which is there by reason of neglect of inflamed or degenerated adenoid tissue, possibly, a constant source of irritation. If we will clear out these vaults, clean out this adenomatous, fibroid or lymphoid tissue, we will get rid of many cases of systemic infection.

DR. GEORGE E. SHAMBAUGH, Chicago: The word indiscriminate would exclude all discussion, because no one believes in removing tonsils indiscriminately. However, the whole subject of removing tonsils for systemic infection is very important. The question of focal infection in systemic disease is much better appreciated by internists than by specialists. One of the most important chapters in medicine is the relationship of focal infection to systemic disease. Not only these rheumatic conditions, but Bright's disease, chronic neuritis, enlargement of the thyroid, appendicitis, have been traced definitely to tonsillar infection. At the Presbyterian Hospital, in Chicago, where most of this work has been done, it has been found that there is a distinct relationship between appendicitis and tonsillitis. Duodenal ulcer, also, often results from focal infection. It is not always the tonsil, however, that is the source of the focal infection. Pus taken from focal infection anywhere else, injected into a guinea pig, will produce gastric ulcer. The infection is produced through some selective action. We are now merely on the threshold of this entire subject. These questions should not be worked out in an isolated way, by dentists, by nose and throat specialists, or others, but by all together.

The question is, how accurately can we tell when the tonsil is at fault? My opinion is that in most cases we can tell pretty accurately. One way of telling is by the history. If a patient has had an attack of rheumatism following an attack of tonsillitis, there is good reason to believe there is an association between the two. I would not take the risk of another attack of tonsillitis in a case of endocarditis. Many patients deny having had sore throat, and in many cases it is possible to find pus in the tonsils of patients who have never had tonsillitis. If we are not able to demonstrate any positive evidence of the tonsil being the source of infection, can we exclude the possibility of its being so? Before removing the tonsils in such cases I want a capable internist to go over the case; if he cannot find any focus, the tonsil is the most sus-

picious source. I may cite an illustrative case. A woman, of perhaps fifty years of age, consulted me two and a half years ago, saying, "I have neuritis in my right arm; I want you to take my tonsils out." I asked her why she thought she had tonsillitis. "Some of my neighbors," she said, "have rheumatism, have had their tonsils taken out, and are better." She was under the care of Dr. Billings, and I sent her back to him. She came back after a week, saying he said take the tonsils out. I could express nothing from the tonsils. In removing one of the tonsils I opened an abscess. The patient got well of the neuritis. Another case in point was that of a physician who had had rheumatic fever for several years, an attack every year. He had had five attacks of tonsillitis. The internist could find no other source of infection. The man was seventy-one years old, and did not want to have his tonsils removed. He continued to have the attacks of rheumatic fever. I finally took out his tonsils, but he was not improved. It was then found out that he had an urethral abscess; treatment of this cured the rheumatism.

DR. OTTO T. FREER, Chicago: Why should the internist be the one to make these examinations? He can examine the chest, the abdomen, etc., but he is not the one to examine the nostrils. There has been a slaughter of the innocent in this matter, with the general practitioner taking out tonsils. I agree that the tonsil is apt to be the source of infection, but the pharyngeal tonsil, as Dr. Logan has said, is more often the source of the trouble than the faucial tonsil. The lymphatics usually tell the story of focal infection. If I find no lymphatics involved, I am not inclined to consider the tonsil the cause of the infection.

DR. SHAMBAUGH, continuing the discussion: The internist is the one to help the patient to get the problem threshed out. Glandular infection has nothing to do with systemic infection.

DR. GREENFIELD SLUDER, St. Louis: It seems to me that there are two problems the solution of which will eventually clear up the question: first, the physiology of the tonsil; second, the perfection of Dr. French's work. The tonsil takes up what is put upon its surface very readily, this is quickly absorbed, and is thrown into the system beyond the tonsil.

DR. RICHARDSON, closing the discussion: After giving the

title of this paper to the secretary last winter I was sorry several times that I had done so, because the more I thought of it the more I realized how difficult it would be to discuss the subject without incurring the ill will of one faction or another.

Dr. Casselberry agreed with me most thoroughly, without intending to do so. I am glad that Dr. French's work bids fair to solve the problem. Dr. Shambaugh has emphasized one point that I tried to bring out—that there are other points of focal infection besides the tonsil. It is our duty to be able to elicit these for the internist. Dr. Logan has called attention to the fact that there may be crypts in the pharyngeal tonsil which are as much diseased as the crypts in the faucial tonsil, and which are as apt to cause systemic infection. I recall a case, sent me by an internist, in which the patient asked me to look in her right ear. I did so, and found a chronic supuration, which she said began when she was fourteen years old, following scarlet fever. She was then twenty-six. She had beginning rheumatoid arthritis. I did a radical operation on the ear, but did not touch the tonsils. She is well and working.

We must conscientiously go into these cases, examine the ears, the sinuses, the vault of the pharynx, the teeth, and note whether these will help us in the study. It is not only rheumatoid arthritis, but all the other forms of infection, that may be due to these focal lesions. In cases which cannot be made out thoroughly, even if the tonsils do seem to be infected, one must be on the lookout for syphilis and latent tuberculosis.

Effects of Protein Extracts From Fruits and Pollen on the Upper Air Tract.

BY WALTER F. CHAPPELL, M. D.,

NEW YORK CITY.

The writer has recognized for some years that some people suffered from a variety of local irritations of the mucous membrane of the upper air tract and external auditory canal, which were attributable to eating certain fruits or drinking certain wines.

In the early summer cases of pharyngitis and laryngitis were classed as strawberry throats; in the autumn as cider and grape throats, and an occasional tomato throat. In addition, pain, tenderness and swelling of the external auditory canal

were traceable to eating apples and drinking cider. Occasionally an acute sneezing, accompanied by discharge and swelling of the mucous membrane of the nasal passages, followed eating quantities of grapes or drinking claret or similar red wines. In a few instances these symptoms were attended by swelling and burning sensations of the tongue and lips. There are children who have stuffy noses, constant colds, pharyngitis and croup due to the nature of the food they take.

Raw apples cause the greatest trouble, but when one is anaphylactic to one fruit he may be to several others.

Cooking these fruits greatly modifies their effect, but even then if taken in large quantities and continued for some time, they still produce irritations of a milder degree.

Believing that the protein extracts of fruits might be the cause of these conditions, protein extracts of apple, strawberry, grape fruit and tomato were made for the writer, and applied to five people known to be anaphylactic to apples, strawberries and to tomatoes, while a sixth person was used as control.

Terrific reaction followed the injection of one minim subcutaneously of apple protein extract of a 1 to 60,000 strength, with a drop on a small abraded surface. Local reaction only occurred in the second case, as also in the third case. Severe reaction followed the local application of the strawberry protein in the fourth case, and only some redness followed the intracutanetous injection of the tomato extract in the fifth case.

In hay fever cases the writer has seen much benefit follow the internal administration of cinchonidia sulphat, but he has seen no permanent cures following this treatment.

The laboratory reports are also presented.

Pollen Therapy in Hayfever.

By J. L. GOODALE, M. D.,

BOSTON.

Methods of gathering and preserving plant pollens are discussed. A fourteen per cent solution of alcohol was found to preserve the pollen extract for several months. When hay fever patients receive an application of the exciting pollen to a scratch of the skin, a definite reaction occurs, consisting of

edema, hyperemia and itching. The application of this test enables us to determine the special causative plants for each case. The intensity of these skin manifestations may be sensibly diminished by the repeated parenteral administration of the proteids in question. Coincident with the diminution in skin reaction there seems to occur an increased tolerance of the exposed mucous membrane to the pollens of the plants employed. Pollen therapy in hay fever may be regarded at the present time as a promising method of treatment, but its value and the permanence of its results remain still to be definitely established.

Serobiologic methods have shown the phylogenetic relationship of the different plant orders and families. The application of these discoveries to the treatment of hay fever by injection of plant proteids promises to assist in the selection of the specific material required for a given case.

DISCUSSION ON PAPERS OF DR. CHAPPELL AND DR. GOODALE.

DR. BURT R. SHURLEY, Detroit: I have been extremely interested in the working out of the question of sensitization to the pollens of ragweed and goldenrod, which are the only pollens I have been able to secure. The whole question of anaphylaxis and sensitization has been explained by Vaughan, of Ann Arbor, by the splitting of the proteids and the elaboration of toxins, ptomaine and leucomains. His theory is very rational. He has shown that egg white will kill a guinea pig in a short time. A toxic dose after the ninth day is fatal.

A number of Dr. Goodale's observations I have been able to confirm as I have worked along. If the dosage is run too high the depression is great, resulting, perhaps, from the exhilaration of the toxin.

One laboratory has turned out, from the clinical standpoint, practically all the pollen toxins which can be used in hay fever. Fifteen doses, in ascending scale, may be found in the market. The clinical value of this I do not know, but it is claimed that fifty per cent of hay fever patients are absolutely protected during the hay fever season.

DR. EMIL MAYER, New York City: The question of standardization is very important. Standard solutions, not stock solutions, should be employed. Standardization can be done and must be done, just as is the case with the pharmacopeia,

in which a fluid extract represents so many grains. For this reason I resent the rushing in of a chemical firm and the presenting of a stock pollen. The work presented today is very gratifying.

DR. HARMON SMITH, New York City: The first patient mentioned by Dr. Chappell was a patient of mine, suffering from what I thought was eczema of the external ear, of uric acid origin. Since he was under my care he went to Dr. Chappell. He was a large man, of fine physical stature, weighing over one hundred and eighty pounds, and not at all neurotic. When I saw him he had a large welt on the arm, extending around about two-thirds of the arm. He was very sick, giving every evidence of great physical depression. The doctor mentioned in this paper I also knew very well. His reaction from the strawberry I am sure was produced absolutely by the protein in the fruit.

DR. MAX A. GOLDSTEIN, St. Louis: These reports convince us that we have been working in the dark for the last few years. Animal proteids, vegetable proteids, and the whole series and ramifications of proteid substances and their anaphylactic reactions, will have to be reduced to a system before any practical clinical work will be accomplished in hay fever. Standardization is necessary for practical purposes. Unless we can reach a more definite and limited basis we will never see the end of this tremendous field.

I have in mind the wife of a physician, an internist of unusual standing, who has used calcium salts for the second season, with no practical results as yet.

DR. GOODALE, closing the discussion: I wish to express my disapproval of the procedure which has been brought forward by the chemical firm, of what might be called a shotgun prescription for hay fever. As I understand it, it is to be used in the majority of cases of hay fever. It is possible that in a patient with one sensitization, by injecting this stock product another sensitization may be given.

Fluoroscopic Bronchoscopy. (Supplemental Report.)

BY E. FLETCHER INGALS, M. D.,

CHICAGO.

The fluoroscope is of much value in the hands of the well-qualified bronchoscopist. Its use will lessen the danger and decrease the number of failures where it is indicated. It is of especial value where there is so much mucus, pus or blood that it is very difficult or impossible to see the foreign body, or where granulation tissue covers the foreign body; where there is an abscess cavity in which the foreign body is hidden; where a stricture has formed, and in difficult cases in which the body is lodged in a bronchus going to the upper lobe of the lung, or in any bronchus where it cannot be exposed by the ordinary methods.

It is better not to use any anesthetic, and a narrow, strong forceps that will hold is specially important.

The surgeon standing at the left side of the patient's head and holding the bronchoscope, which was previously introduced to the foreign body, directs it by the shadow to the foreign body. The forceps is guided to the foreign body by the shadow, and the blades are opened and the forceps passed a little farther so as to grasp the foreign body.

Considerable traction may be required to draw the body through the stricture. Two cases are reported to further illustrate the utility of the method.

Report of a Foreign Body in the Lung, the Primary Diagnosis of Which Was Made by a Blood Examination—Removal—Recovery.

BY GEORGE L. RICHARDS, M. D.,

FALL RIVER.

Male, twenty-five years of age, had occasional attacks of asthmatic breathing, bronchitis and chills from some time in early childhood.

It struck the writer as being peculiar that a young man should have occasional attacks of chest pain, occasional attacks of chills and fever of very short duration with only a suggestion of a cough, but with a moderate, steady leucocytosis and with no definite physical signs.

It suddenly dawned on the writer that these symptoms were suggestive of a foreign body in the bronchus, and that all the symptoms might be thus occasioned.

A Roentgen examination disclosed a tack in the right bronchus. There is no history as to when the tack entered the lung.

Dr. Chevalier Jackson, after previous administration of morphin and atropin under cocain anesthesia, and with the aid of the upper lobe bronchus forceps, after dilatation of the strictured bronchus, removed the head of the tack; the point was not forthcoming. The head was much eroded and oxidized. At no time could the tack be seen by direct inspection.

No reaction followed, and no chill or other further trouble with the lung has occurred since.

Foreign bodies which have been in the lung a long time and are unsuspected are probably far more common than any of us have yet ascertained.

DISCUSSION OF PAPERS OF DR. INGALS AND DR. RICHARDS.

DR. ROBERT CLYDE LYNCH, New Orleans: I have here one of the first changes made in the Killian suspension apparatus. It allows for the movement of the horizontal tooth plate about an inch instead of a quarter of an inch, as with the Killian model. One of the great disadvantages of this was that the platform projected into the mouth, interfering with the view. In order to get rid of these disadvantages I constructed an apparatus which has a vertical movement. It allows the opening of the mouth, with nothing to obstruct the view. The principle was found to be entirely wrong; in other words, the center of gravity was found to be to the side of the middle, and the head would pull over to one side. This is shown merely as one of the mistakes made in the development of my apparatus.

The last improvement so far has served very well under all circumstances to which it has been applied. Most of my dissection work has been done in adults, who require more motion than children. It must be made flexible, and must have motion in excess of what is usually necessary. First of all, the base which supports the tongue spatula is extremely heavy and will not bend under any circumstances. I have suspended patients weighing as much as two hundred and fifty pounds.

Again, it will open in the vertical direction two inches, which is in excess of that given by other methods. It has another motion not obtained before. It also has a separable tooth plate. I now use two tooth plates, which will fit on in this fashion (demonstrating). This has the advantage of giving two points of fixation as against one. When the upper jaw is fixed against these two points it is prevented from moving from side to side. The double ring keeps the instrument in the center of gravity. In some cases where the patient is under suspension this screw will jam. In order to prevent that I have had a nut drilled and have a little handle which can be used to jack it up, just as you would use an automobile jack.

The spatula, which has given a good deal of trouble in keeping the tongue in shape, is constructed in my apparatus much on the pattern of the last Killian model. The wings are flexible; with it the sides of the tongue can be lifted up and kept flat. The handle, in other models, was hard to sterilize, so I have constructed one which is made of hard steel, so that it will not bend under the most trying circumstances. It is rough on the back, so that it will not slip. The point tips up a little, the wings are fixed. It shows the anterior commissure much better than is possible with the older models. The instrument is introduced closed.

DR. HARMON SMITH, New York City: Dr. Ingals' method of locating and extracting foreign bodies recalls an unfortunate case which I saw in consultation. The patient, a man, had inhaled a hand dental bur, which consisted of an aluminum handle and bur. The dentist had dropped this instrument on the patient's tongue, turned around to take up another instrument, and during this time the man inhaled the bur. He was advised to have an X-ray taken. He went to a business meeting down town, and afterwards had the X-ray taken. This showed the foreign body in the left upper lobe bronchus, high up. He then consulted an expert bronchoscopist, who worked an hour trying to extract the body. He failed. I was then consulted. I worked at it, but could not get into the bronchus. Another laryngologist was called in, who has extracted foreign bodies under similar circumstances, but could not extract this one. Dr. Jackson was telegraphed for, and came, bringing his own instruments and assistants.

He worked an hour or more, but was defeated. It then became necessary to remove a part of the man's lung. He was an old man, and died subsequently from the shock. It was impossible to turn the corner to get the foreign body in the ascending bronchus of the left lobe.

DR. THOMAS HUBBARD, Toledo: Dr. Ingals' remarks with reference to the liability of the indiscriminate application of the fluoroscopic method of examination are very timely. In a case recently under my observation the method was tried in removing a tack from the right lung. The tube was passed far enough down to reach the tack and turn it over. A very skillful fluoroscopist was assisting, the operation was prolonged for some time, and every effort made to extract the tack, but it was impacted by the method. It had been turned crosswise and had to be straightened out by a hook.

There is always danger to the fluoroscopist in these prolonged operations. The man whom I had has already lost one finger from epithelioma. There is also danger to the patient.

Sometimes foreign bodies become encysted. I recall a case in which a boy swallowed a nail. Several good diagnosticians went over him very carefully, but could not locate the nail. It was finally located by means of the X-ray, and proved to be an eight-penny nail, which was encysted. There were no symptoms from this foreign body. If the patient is conscious, he will often aid in telling whether we have gotten the foreign body. The finger-thumb action of the forceps is more delicate and positive than the grip with the hand. The action of the Ingals forceps is too stiff.

DR. JOHN F. BARNHILL, Indianapolis: I would like to ask Dr. Ingals to state his method of watching the end of the fluoroscopic forceps—whether an assistant, the fluoroscopist, or he himself watches the end of the instrument; also whether there is any danger of grasping the lung in getting through a spot where there is an abscess.

In the lay press, in all accounts of foreign bodies getting into the lung, the writer always says the patient swallowed a foreign body. Dr. Richards used the same term in his paper. Is it not aspirated or inspired?

DR. WILLIAM E. CASSELBERRY, Chicago: I would like to ask Dr. Ingals the arrangement of the table, and whether a

specially constructed table is required; also whether the fluoroscope as ordinarily used is adaptable for the purpose.

DR. ROBERT CLYDE LYNCH, New Orleans: I recall a case in which a nail was in the lower lobe bronchus. I had made a canvas cot, on a trellis, and put the X-ray tube under this. I directed the forceps from two points of view. To be sure I was in the line of the right bronchus, after getting the tube so that it actually touched the nail, the patient was swung over on his side, and an anterolateral view obtained. The nail was extracted without difficulty.

DR. INGALS, closing the discussion: Dr. Richards spoke of the tack itself coming away piecemeal, or having been oxidized. I had an experience with a much larger nail which had been in a boy's lung for eight years. It appeared two or three times larger than it was. I got nothing but the head; the rest came up as a lot of black fluid.

I watch the forceps myself. In operating from the head of the patient I can look over and see. You cannot do this with someone to direct you how to move it.

It is on account of the danger of puncturing the lung that I caution gentleness. If you use enough force you can easily puncture the lung, but it is not at all necessary.

I understand perfectly the danger of prolonged fluoroscopy, and that is why I said one should always have an expert fluoroscopist. The light should not be turned on more than a half minute at a time. The operation should certainly not be prolonged excessively.

I use specially arranged tables so that the light can be placed wherever I want it. Sometimes it is necessary to have a simple board made which raises the ordinary table found in the hospitals.

This method should not be employed whenever a patient has a foreign body in the lungs; it should be the last resort. The foreign body should be found and removed by other methods, if possible. When the operation can be done under inspection it is much better. Where there is a stricture which is difficult to dilate, this may fail. Dilatation of a stricture is difficult. It may not be necessary, as it will sometimes dilate as you work if you can get the forceps through. It would not take more than two or three minutes to get through a stricture. When the foreign body is high up in the lung it is difficult to see it.

That can be helped a good deal by position. If the patient's head is turned to the side and the direct bronchoscope toward the middle, you can see the upper branch of the bronchus.

DR. RICHARDS, closing the discussion: The question arises in connection with these foreign bodies, how long and how much we are justified in searching for them? Dr. Smith's case calls to mind a case in which an attempt was made to remove a small gold pin of the safety pin variety. The patient was a young woman. Killian, before a committee of medical men, worked for an hour or more and failed. Later in the same summer Dr. Jackson tried to remove the same gold pin at the Rhode Island Hospital. He worked about an hour and a half, and gave it up. The girl went into the hospital as a patient, remained as a pupil nurse, has been there for two and a half years, and has never had any pain from that pin. It is a question sometimes whether we should not wait for more definite symptomatology. I think in Dr. Smith's case if they had waited the man might be alive today.

DR. SMITH, continuing the discussion: I was advised to wait in the case which I mentioned. The majority of the consultants wanted to wait, but Dr. Jackson said pneumonia might result. The matter was put up to the family, and they said operate by all means. The man was in such a nervous state it was thought he would die anyway. The head was bent over as far as the man's neck would allow, and it was determined that tracheotomy would offer no further aid. Dr. Jackson had recently read a paper in Brooklyn on the limitations of bronchoscopy. One week previous to that he had used similar instruments and had removed successfully a body which had gone down to the lower instead of the upper bronchus.

DR. INGALS, continuing the discussion: As to the duration of the operation, one might well adopt the rule that one hour should be the limit. Ordinarily a half hour is sufficient. If the patient is in good condition one may keep on for an hour, and then try again some other day. It is better to let the patient live with the foreign body in than to keep on too long. Many patients live for eight or ten years with foreign bodies in their lungs. It is better to wait and give the patient a chance. The probabilities are that a foreign body in the upper lobe will settle down to where it can be more easily reached.

The Sympathetic Syndrome of Sphenopalatine (Nasal) Ganglion Neurosis, Together With a Consideration of the Neuralgic Syndrome, and Their Treatment.

BY GREENFIELD SLUDER, M. D.,

ST. LOUIS.

Dr. Sluder reviewed his observations on the nasal ganglion which were summarized in his text "Etiology, Diagnosis, Prognosis and Treatment of Sphenopalatine Ganglion Neuralgia" (Transactions, Section Oto-Laryngology, American Medical Association, 1913). One point only was added to this text, namely, the very great difficulty incurred sometimes in effecting a cure of that neuralgia is explained by the fact that hyperplastic sphenoiditis underlies the disorder and may frequently be overlooked because the picture in the nose is not very striking and that the pain is very much of the time a pure ganglionic neuralgia. Such cases require careful selection to decide whether they be injected, or take the Hajek postethmoidal radical operation. To the already described picture he added the "Sympathetic Syndrome," which in its fullest development is characterized by great sneezing, watery discharge and swelling of the nose within and without (rosacea), with profuse lacrimation, reddening and swelling of the lids, dilatation of the pupils with the appearance of slight exophthalmos (staring), a sense of itching and burning, or a feeling of wind blowing into them, together with a peculiar sense of discomfort, which seems independent of secretions or congestion; and more or less photophobia, sometimes very great. In addition to these symptoms, there are sometimes dyspnea with dry râles. He found that cocaineization of the nasal ganglion relieved this symptom complex. He observed furthermore that it was often subdivided, sometimes being merely the sneezing, sometimes red nose (rosacea), sometimes secretions, lacrimation and photophobia. He stated that many of the ordinary coryzas are of this type, which of course are to be differentiated from affections of the membrane leading to suppuration of the sinus. He recommended the same treatment as previously given for the neuralgia syndrome. He offered a probable explanation based on anatomic and physiologic facts. Anatomically, the fibers of the cervical sympathetic from the nasal ganglion pass downward by way of the

Vidian and carotid plexus to the cervical sympathetic and give branches to the cervical nerves and to the lower cervical ganglion, which is often fused with the first thoracic. These ganglia are anatomically allied to the nerves which, in addition to supplying the neck, also make up the brachial plexus and supply the upper extremity. Accelerator fibers for the heart and vasomotor fibers for the lung also pass through these ganglia. He felt that it was a lesion of the sympathetic elements of the nasal ganglion which explains not only these vasomotor secretory phenomena, but also the pain referred into the neck, shoulders, arm, etc., as Vidian neuralgia, and that it came to pass by virtue of the sympathetic fibers which arborize about the cells of the spinal ganglia of the nerves which make the supply of the neck and upper extremity. He also offered as explanation of nasal asthma the fact that accelerator fibers for the heart and vasomotor fibers for the lungs pass through the lower cervical and first thoracic ganglia, through which also pass the cervical sympathetic fibers, and that the pain of angina pectoris might be explained by impulses arising in the heart passing upwards through the above mentioned ganglia, which are in association with the brachial plexus. He found that the pain of glaucoma, iritis, corneal ulcer, keratitis, conjunctivitis was controlled by anesthesia of the nasal ganglion, and that it was a nerve blocking process. He thought that it was the sympathetic that transmitted the "heavy pain" from these lesions which went into the occiput and the neck, and found that the course of some of these diseases was benefited by the control of the pain, and wondered if some trophic influence were not also exerted through these paths. He had at times succeeded in stopping the râles by cocaineization of the nasal ganglion on the same side on which the nasal ganglion was cocaineized in some cases of asthma of not too great severity.

DISCUSSION.

DR. HARRIS P. MOSHER, Boston: I think Dr. Sluder will remember that in a conversation some years ago I made the remark that somebody, some day, would do something with Meckel's ganglion, and straighten us out about hay fever. I have been waiting for someone to do this. Dr. Sluder has done it, and I congratulate him upon that achievement. Two

years ago Dr. Matthews, of the Mayo Clinic, came to Boston and said he had been having great success in curing headache due to closure of the frontal ostium, and had cured hay fever by the cauterization of the two sides of the middle turbinal. I doubted that this was as he said it was; I did not adopt the procedure. He came back to Boston and I asked him about it; he said he had been curing frontal headache, asthma, and hay fever. After two years of knowledge of that procedure I began to try it in the clinic at the Massachusetts General Hospital. Cauterization of the outer and inner surfaces of the middle, followed by the application of adrenalin, was successful. I could not see then how it worked; I do see now, thanks to Dr. Sluder.

DR. SLUDER, closing the discussion: Answering the question asked by Dr. Freer, as to where I make the injection in order to get at the nasal ganglion: The sphenopalatine foramen is situated immediately posterior to the posterior tip of the middle turbinal, and absolutely never varies. It is at that point that I make the application. In this kind of cocaineization I prefer to take the slightly curved applicator and curl around. For total cocaineization of the ganglion I prefer to slip the applicator under the point and approach it thus. It takes a tiny bit of cocaine, and the applicator under the turbinate can be left in place. For operative purposes I leave it under the tip. For the sympathetic acute syndrome I simply paint it, and paint again if necessary. It is astonishing to see the effect of the cocaine. I use a saturated solution of cocaine, by preference the large crystals. The large crystal is freer from poison than the rest. A poison is left in the mother liquor. The small crystals come out first, and then the big ones, which are freer from poison. The ganglion is almost submucous in many skulls. With the Holmes pharyngoscope I can see how I am going. I prefer a straight needle under the tip.

Report of Progress of a Case of Pituitary Tumor Reported in 1914.

By T. H. HALSTED, M. D.,

SYRACUSE.

At the last meeting of this society I reported a case of cyst of the hypophysis, occurring in an Italian girl, nine years of age, upon whom I operated, following the method of Hirsch,

doing the operation in three stages under cocain anesthesia.

This child came under my observation for the first time on February 6, 1914, fifteen months ago, at which time she presented briefly the following symptoms:

She was very large for her age, marked and increasing adiposity; skin was dry and harsh; hair dry and coarse, growing low on the forehead; eyes large, pupils dilated; marked general ataxia with intention tremor, chorieform movements; well marked athetosis; paralysis of the pupil; deep and superficial reflexes not altered. There was extreme difficulty in making coordinated movements, gait was unsteady, complained of frequent dizzy spells, headaches were very severe nearly every other night, and the sight was decidedly impaired. She was unusually bright mentally. An X-ray showed the sella turcica to be somewhat larger than the average normal at this age, while above and posterior to the sella the brain area was of lessened density.

All the operative work was under five per cent cocain with 1-2000 adrenalin, and was done in three stages, the last stage consisting in incising the tumor, which proved to be a cyst, liberating about one-half an ounce of clear, limpid, straw colored fluid, and was followed by quite a decided change in the symptoms.

The child recovered from these operations, finally being taken to her home in a neighboring village three months after the last operation, on the whole not improved by her surgical experience, the cyst having evidently refilled. The parents declined further operation, and I have seen her only two or three times, as I have gone out to see her at her home. Pituitrin was given her for several months, but for six months she has been without it. Her present condition is as follows:

Child is now ten years of age and is confined constantly to bed. Muscular weakness is so great that she cannot walk unaided, and to assume the upright position must be literally held or propped up. She can sit up in an arm chair or rocker with arm and head supports. There has been an enormous increase in adiposity, the fat being distributed throughout the body, while her head has increased to a size that for her age is almost huge. Comparing the measurements of her head with that of two sisters, one a year older and one a year younger, it is found that the measurement of the circumfer-

ence on) a level with the parietal eminences is in the older child twenty-one inches, the younger, twenty and three-fifths inches, while the patient's head measures twenty-five inches. The vertical measurement of the circumference under the chin, back of the ears, taking in the parietal eminences, is for the older child twenty-three inches, the younger, twenty-three and one-half inches, while the patient's measurement is twenty-six and one-half inches in this circumference. While the patient's head was larger than normal at the time of operations fifteen months ago, the increase in size since that time has been most striking. The color of the hair is a very dark brown, has not increased in coarseness, and the tendency to become reddish, as a year ago, has ceased. There is a marked tendency to somnolence most of the time, the child sleeping a great deal during the day as well as night, although for some days and for a week or two at a time this may not be the case. She is unable to feed herself because of the incoordinated movements and the lack of muscular strength. Intention tremor is very marked. She cannot wipe her face because of the tremor nor approximate the finger tips; or attempting to stand alone the foot is drawn inward and upward, in the position the foot would assume in standing on the outside of the foot. She is unable to hold her head up unaided, apparently due to lack of muscular strength.

The cranial nerves are apparently normal excepting the optic. Reaction to light is much impaired. Pupils are not widely dilated. She can distinguish fingers at six feet. The motor nerves all functionate, but are weak. She can distinguish heat and cold. Reflexes are exaggerated. Babinski is marked. There is apparently no great increase in the amount of urine, though it is frequently passed involuntarily. Stools the same. Speech is difficult and thick. Memory does not appear to be very greatly impaired. For instance, she asked by name after many of the patients and nurses she had not seen in fifteen months. On examination of the nose it is found that the base of the sella, covered by the mucous membrane, is freely seen, the anterior wall of the sphenoid being absent. It would be a very simple matter to reincise the tumor if the parents' consent were granted, or if it seemed advisable to do so. I have not urged an operation because of the almost certainty that the cyst would soon fill. The accom-

panying photograph gives a very clear picture of the child's general appearance.

DISCUSSION.

DR. JOHN F. BARNHILL, Indianapolis: I have employed the Cushing method, using the Cushing retractors. After the parts are dilated the septum can be taken away for the purpose of getting at the anterior wall of the sphenoidal sinus. After that the nose can be dilated as much as needed. This gives a clear-cut view of the field. The Cushing retractor and dilator are absolutely necessary. The speculum itself is built very much like the old Marion Sims bivalve speculum. The operator is not hindered by any hands being in the way. The method is very commendable.

DR. HALSTED, closing the discussion: I have never seen the Cushing operation, so I cannot compare the two. The method which I employed involves a little operation which West originally did, and to which Coffin called attention—that is, doing the submucous and going on up to the rostrum of the sphenoid. In the second operation the posterior end of the septum was taken off completely, mucous membrane and all. That gave a tremendous field. The advantage of this method over Cushing's is that it can be done under local anesthesia, in two or three stages, and one gets as good view as is necessary.

History of a Tumor of the Pharynx Eventually Terminating in Sarcoma.

BY RALPH BUTLER, M. D.,

PHILADELPHIA.

A healthy married woman aged twenty-one years developed a series of pharyngeal tumors which were apparently cured four times in the course of two years. The first attack yielded to inunctions and protiodid of mercury. An almost fatal attack was relieved by iodid of potassium, mercury and neosalvarsan. In two other recurrences, the X-ray treatment was used in addition to the mercury, iodid of potassium and neosalvarsan. The Wassermann reaction was weakly positive at first, and the luetin reaction was positive. The first microscopic examination suggested syphilis, the second, small round-cell sarcoma. The autopsy showed small round-cell sarcoma with beginning metastasis.

DISCUSSION.

DR. GEORGE L. RICHARDS, Fall River: A certain number of sarcomas of the upper air tract seem to spontaneously disappear, or to be influenced by remedies which it hardly seems to think would have any curative effect. I recall a case of sarcoma of the right upper jaw, in a woman fifty to fifty-five years of age, a boardinghouse keeper. The diagnosis of sarcoma of the antrum was made by a laryngologist of ability, and this was confirmed by general surgeons. She was being treated with Coley's fluid when she fell into the hands of a Christian Science healer, and the tumor disappeared. I have seen her four or five times in association with a general surgeon. I have tried to get the opportunity of examining her again, but she is still under the control of the Christian Science healer.

DR. G. HUDSON MAKUEN, Philadelphia: I had the privilege of seeing the patient mentioned by Dr. Butler during the interval of the fourth time that she appeared to be cured. I think no one who was present at that meeting thought of the probability of a return of the trouble. She had nothing in the throat except a considerable amount of scar tissue and the cicatricial contractions, as described by Dr. Butler. Her breathing and articulation were fairly good. It was a surprise to us all when she reported her death at the following meeting.

DR. GEORGE A. LELAND, Boston: I was called last winter to see an old lady, seventy-three years of age, who had enlarged glands in the neck. I made the diagnosis of lymphosarcoma. She was put under treatment with Coley's fluid, and he writes me that the tumor has entirely disappeared.

DR. HARMON SMITH, New York City: We should not depreciate the benefits of Coley's fluid. I recall a case of sarcoma of the antrum occupying the entire nasal cavity and projecting outward. There was lymphatic involvement, and the case seemed hopeless. It was pronounced sarcoma by the pathologists. I said the only thing we could do was to operate, and that if he died on the table it would be the most satisfactory termination of the case. The patient went to the General Memorial Hospital, was put under treatment with Coley's fluid, and the sarcoma entirely disappeared.

DR. HENRY L. SWAIN, New Haven: Whether the disappear-

ance of these tumors is due to tumor transformation, as has been suggested, or to the agents employed, the fact is that we stand with reference to them in the position of strict empiricism. This applies to Coley's fluid as much as to anything else. If we could collect all the observations on the subject, we might then have something to go by; until that is done its use will always be empirical. I have two cases in which it seemed to do good, and many others in which it accomplished nothing.

NEW YORK ACADEMY OF MEDICINE,
SECTION ON OTOTOLOGY.

Meeting of May 14, 1915.

Suction Tubes.

DR. HAROLD M. HAYS said that the instruments which he presented consisted of a set of six tubes, and were used in the eustachian tubes, pharynx, nasopharynx and the nose by means of the suction pump. They were simply glass tubes blown in such a way that there was a little place which was used as a container for the secretions. The suction was not started until you put your finger over the hole which closed the entire glass tube. It was extremely efficacious in cleaning out secretions from around the middle turbinate and from the ear. There was nothing particularly unique about them, Dr. Hays said, except that they did the work very nicely. The most important of them was the nasal suction tube; the second the aural tube; third, the tonsillar tube; fourth, the eustachian tube; fifth, the nasopharyngeal tube, and sixth, the pharyngeal tube. The tip was attached to the Sorensen suction apparatus and could be used very easily. To clean them out the compressed air was just blown through in the opposite direction to which the suction was used. They were manufactured by Sorensen, who makes the suction pump.

DISCUSSION.

DR. ISIDORE FRIESNER said that Sorensen had made for him a suction apparatus somewhat on this style, that he would show at the Section on Laryngology at its next meeting. The purpose, or rather the reason, for its being devised was this: In using suction they took an ordinary catheter that led from the suction bottle, and the material that was sucked out from the ear or nose was drawn into this suction bottle through a long tube, about five or six feet long, and cleaning the bottle and tube was a very disagreeable job. Dr. Friesner had Sorensen make a metal container which looked something like a milk can, into which was ground a stopper. At one end of

the stopper a catheter was fastened, and at the other end the rubber tube leading to the suction bottle was fastened, so that the material from the nose, throat or ear is sucked into this milk can, which can be kept clean and sterilized. In this way he said he had avoided the necessity of cleaning out the bottle and the tubing that leads from the catheter to the suction pump.

DR. JOHN GUTTMAN said he did not see how one could get the ear air tight by the use of these tubes. He sometimes used Sigel's otoscope, which is quite efficacious in such cases, as one could get the ear air tight, or one could get a hyperemia which could be of some effect, but he did not understand how Dr. Hays got an air tight space with these tubes.

DR. ERNST DANZIGER said he wanted to ask the same question, because he had had the experience that when he took the suction apparatus of the Sorensen pump, the patient could not stand the negative pressure, and even complained about the suction from the ear, and he wondered how you could regulate the amount of suction. He had not succeeded in sucking matter out without endangering the patient.

DR. HAYS said his object in making these tubes was to clean out secretions and not to get any particular suction in the nasal cavities or the ears. With the small tubes that he used for the nose and ear, if one had a case of otitis media purulenta acuta, one did not have to get up near the drum at all. One could easily keep an eighth of an inch away with the tubing. Of course, he could not create a hyperemia with these tubes. He had used them in a frontal sinus case where the secretions were drawn from the middle turbinate. He thought the electric suction pump was sometimes a pernicious thing to use, and would advise the use of a water pump, which would do the work more easily than an electric pump.

Dermatoses of the Auricle.

DR. PAUL E. BECHET presented the following cases:

Lupus Erythematosus.—This man, H. P., was thirty-six years old, and presented the disease in its early and untreated state. It had been present for one year; its later manifestations were absent. The lesions were mostly confined to the nasal and aural regions.

Lupus Erythematosus.—P. Z., male, adult. The lesions in

this case first appeared on the nose about two years previously; the face and ears became involved shortly thereafter. Six months previously the disease invaded the scalp. The eruption was a very extensive one, covering a considerable area of the face and scalp. A biopsy showed a hyperkeratosis of small round cells in the corium and scattered lymph spaces. Round cells were also seen around the sweat glands. Carbon dioxid snow and iodine had been used externally.

Lupus Erythematosus.—This was a case of lupus erythematosus in a colored boy, W. B., aged twenty years. It had been present for six years. The condition was a very extensive one, the ears being considerably involved. The case was presented in order to show the marked difference in color which the disease presents when it occurs in the negro race.

Lupus Erythematosus Disseminatus.—A. O., male, adult. This case of lupus erythematosus was of the disseminate variety, a patch of the disease being present on the chest. The eruption was very extensive and particularly noticeable over the mastoid region. The lesions showed the peculiar retrogressive changes which usually take place when they are treated by means of actinotherapy. The patient for the past year had undergone very frequent exposures to the quartz-mercury lamp, with apparently considerable benefit. The eruption had been present for six years.

Psoriasis.—This patient, female, adult, was thirty years old and had had her then present eruption for the past seven years. It had fluctuated in its degree of severity, but had never entirely disappeared; at the time of presentation she claimed it was at its worst. It was, as could be noticed, very extensive. She was, as is quite ordinary in this disease, in general good health. The eruption consisted of dry, scaly, infiltrated, irregular plaques, covering most of the face and scalp. On the body it was much more discrete in distribution. The face was a very infrequent site, and it was rather unusual to see it so greatly affected as it had been in the present instance.

Leprosy.—The patient, a Greek, aged thirty-seven years, stated that the disease had first become manifest three years previously; since then there had been a steady increase in the symptoms until he came under observation some six months before. He had been living in the United States. The dis-

ease was of the mixed type, there being marked areas of infiltration on the face and ears, with nodules and anesthetic areas on the hands. The condition had greatly improved under chaulmoogra oil. When first seen the disease was distinctly nodular, the auricles covered with tubercles and infiltrations, and the face had assumed a leonine appearance. While the condition had largely ameliorated, enough remained to possibly prove of interest. *Lepra bacilli* were found on biopsy. The Wassermann reaction was negative.

Tuberculid.—S. K., adult, male, aged twenty-two-years, stated that he had first noticed the eruption about two years previously. It had since slowly progressed to its then present appearance. He presented for examination a large number of nodular lesions covering the auricles. Some of the lesions were crusted, others seemed to be undergoing central necrosis, and still others tended to vesicular formation. On the back of his hands could be seen several annular lesions of the granuloma annulare type.

Cicatrix Following Prolonged X-Ray Exposures.—The patient, C. H., sixty years old, had received prolonged exposures to the X-ray ten years previously for a lupus vulgaris of twenty-five years' duration. The lupus had apparently entirely disappeared, leaving the then present atrophic, cicatricial, telangiectatic area, involving the ear and covering most of that side of the face. The reddened scaly lesions above and beneath the eye had been present for the past four months only, and were eczematoid in nature.

Paper: Temporosphenoideal Abscess With Unusual Complications.*

By JOHN LESHURE, M. D.

DISCUSSION.

DR. THOMAS J. HARRIS said he wanted to refer to the case of Dr. Leshure, but only in a general way. The report of Dr. Leshure's case impressed him most by its conclusion. Unfortunately, no autopsy had been obtainable. It seemed to him that we had all been laboring under a tremendous handicap in developing careful and scientific otology in this country. That handicap was our inability to carry cases to a

*See page 854.

proper conclusion, to check up their results and know exactly what might occur. This was not the first time that reference had been made to this, but those present who had had the privilege of working in the foreign clinics and seeing the advantage they had in them, how they are able to confirm or disprove their clinical findings on the postmortem table, knew what he meant. He did feel that it was a subject of such great importance, that at a proper time this section could very properly cooperate with other sections in endeavoring to establish in the hospitals of this city some rule or regulation that for hospital patients and ward cases there should be a release signed, so that such cases will have given their consent to an autopsy in the case of a fatal result. Until this was secured Dr. Harris did not see how they could arrive at the satisfactory conclusions with regard to brain abscesses and other intracranial conditions. That when they did get this far they would accomplish more than in any of the years gone by, because they would be able to draw accurate, definite, clear conclusions, and not as in Dr. Leshure's case, which he had studied clinically only, but where the clinical findings could only be a part.

DR. JOHN GUTTMANN said he would like to know on what side the abscess was. It seemed very hard in these cases of the right side to make the proper diagnosis, and probably this was the reason why the result was fatal.

DR. JOHN LESHURE said he would like to ask if any of the gentlemen had seen a phenomenon like the one he spoke of. In speaking to Dr. Faber, the latter said he had seen it in one case, that it certainly seemed unusual that the symptoms should be on the side of the lesion.

Paper: Report of a Case of Multiple Abscess of the Brain—Operation—Recovery.*

BY JOHN GUTTMAN, M. D.

DISCUSSION.

DR. JOHN R. PAGE said that he would like to ask Dr. Guttman if he found the abscess at the first introduction of the director, or whether it was found after one or two explorations in different directions had been made.

*See page 858.

DR. JOHN GUTTMAN said that it took several explorations before he found the abscess.

DR. JOHN R. PAGE said the reason he asked the question was because the case seemed to illustrate a point made by Dr. Kerrison in his book by means of a diagram showing the possibility of creating pathways of infection for the formation of secondary abscesses by exploration in different directions with a director through the same opening in the dura where the abscess is not located at the first exploration, the pus from the abscess flowing over the openings of the previous explorations, forming abscesses later on. He thought some of the gentlemen recalled this diagram, and possibly it was an explanation for the secondary abscesses in this case.

Paper: The Bacteriology of Acute Otitis Media and Mastoiditis and Their Complications—Blood Cultures.*

By JAMES GARFIELD DWYER, M. D.

DISCUSSION.

DR. W. L. MCFARLAND said that in connection with organisms found in the mastoid cavity it was interesting to recall the study of the bacteriology of acute middle ear infections by Karl Süpfle, at the University of Heidelberg, in 1906. Süpfle found in examination of fifty-seven cases that some form of streptococcus was present in forty-five of the number. As six were designated as Tubenkatarrh, the percentage of positive streptococcus cultures was higher than it at first seemed. Though these cultures were made with material drawn with great care from the middle ear by means of a sterile capillary pipette, staphylococci usually manifested themselves on the plates. Süpfle's classification of the streptococci is an old one, and it would be interesting to reclassify his results for comparison with those of Dr. Dwyer.

Dr. Dwyer's emphasis on the unreliability of the average culture made from the ear canal was very timely, for it seemed not to be sufficiently recognized that numerous rapidly growing but nonpathogenic organisms, frequenting that locality, usually choked out on culture plates those pathogenic bacteria which they sought to grow.

As cultural methods became more refined the percentage of

*See page 861.

positive blood cultures increased, though the day when the ratio of bacteremias to bacterial infections was ascertained seemed far distant. Dr. Dwyer's views concerning the significance of negative blood cultures appeared to be those held by the majority of men who did such work, as were also the reasons he gave for their being obtained. As an illustration of the diversity of opinion on this subject, it was maintained by Schotmüller of Hamburg that negative cultures are frequently due to failure to cultivate anaerobically, and other bacteriologists said that plates were not incubated a sufficient length of time. In opposition, Neisser says that anaerobic streptococci as mentioned by Schotmüller have practically never been obtained at his institute, and many bacteriologists held that after a certain length of time in the incubator bacteria would autolyze rather than multiply.

DR. MCFARLAND said that the section was to be congratulated in having presented to it by Dr. Dwyer such a lucid and logical paper on a very vital subject.

DR. E. LIBMAN said the only point he wished to make was the following: In all the publications which he had made, including the ones with which Dr. Cellar was associated, the statement was made that they had not had any cases of pneumococcus sinus thrombosis. That statement needed a certain amount of alteration at the present time, because they had found two cases in which atypical pneumococci were found which have produced the sinus thrombosis. When a pneumococcus changes into a streptococcus, their experience had been that the first change that occurs is that the pneumococcus becomes insoluble in bile and then acquires a power of what they call precipitation (that is, the power of precipitating proteid in agar containing serum and glucose). They could state their experience at the present time in the following way: They have never seen a bile soluble pneumococcus produce a sinus thrombosis, but they have seen sinus thrombosis produced by pneumococci which had changed more or less over to streptococci.

DR. DANIEL S. DOUGHERTY said he might cite a case he operated upon a week ago that day, to emphasize the statement of Dr. Dwyer, that negative findings might be due to a walling off or a damming of the pus. This case had been operated on by one of his assistants some eight days previously

and the lateral sinus injured. The case jumped a septic temperature, running up to 105° and then down to nearly normal, and after that up again to 103° and 104° . Dr. Dougherty had three bacteremic examinations made, and all three were negative. He operated and stated that he did not resect the jugular. When he exposed the jugular he found it collapsed above the facial, and he merely put a ligature above the facial and then opened the sinus and found it fairly full of pus, with a large thrombus in the jugular bulb. The man is now making an uneventful recovery.

Dr. Dougherty said he had been very much interested in the work and paper of Dr. Dwyer, and stated he would like to know if the colon bacillus had been found in any of the middle ear infections. He had reported a series of twelve such cases from his City Hospital service, among which there were five cases of acute mastoiditis, one complicated with sinus thrombosis, and one by an abscess of the temporal and occipital lobes. In the cases complicated by the brain abscess the colon bacillus was found in pure culture, and in the sinus thrombosis case, mixed with a slight quantity of staphylococci. One of the cases that he performed a radical operation upon had the colon bacillus in pure culture, and one of the acute mastoids also showed a pure culture, as also one case of chronic otitis media. The others were mixed cultures. In the cases reported the material was taken from the middle ear under fairly aseptic conditions, the ear being swabbed out thoroughly and a pledget of cotton placed in the canal for some twenty minutes, the pus being then taken out with a platinum loop, put well back into the middle ear. He said he had looked over the literature pretty thoroughly and had not seen any cases mentioned of this character. Three or four days previously he had received a letter from a captain of the United States army in the Philippine Islands, who said he had seen such a case. Had any of the other gentlemen found any of these cases? Since his series he had found one isolated case. He might also add that two of these mastoids originated from a furunculosis of the canal, and were cases transferred to his service after radical operations.

DR. WILLIAM H. HASKIN said that blood culture was a most interesting question, but that it was not always satisfactory. He had been thinking of two cases in particular, one of

which had been reported there a couple of years previously in a boy. He came in with an acute ear, and the drum was opened, some serum coming out. Blood cultures were taken, and the streptococcus capsulatus was found in the serum. Afterwards the ear cleared up. The boy was desperately sick and ran a septic temperature. Dr. Berg, Dr. Phillips and Dr. Rae had examined him. So far as opening the mastoid, under these circumstances they did not advise operating on the boy, as there was a positive streptococcus capsulatus with no tenderness over the jugular and an acute endocarditis. They watched him for several days and he developed a focus in the right hip joint, and they gave him leucocyte extract. This improved the patient, and at the end of the fifth day a blood culture was taken which proved negative. They then continued the leucocyte extract for ten days. The temperature dropped to normal and the patient never had an operation of any kind. The hip joint remained drawn up and he was taken down to the New York Hospital, where the cavity was exenterated and two ounces of pus removed, but no examination was made to find out what organisms, if any, were present.

In another case a boy came in desperately sick, and they never thought that he would live. He had a mastoid which apparently cleared up except for a tenderness back about one and one-half inch to the knee of the sinus. Five blood cultures were negative. The X-ray showed a slight area of infection. Dr. Law said there was a thickening over the sinus. Dr. Haskin asked him if he would operate on the findings of the X-ray, and he said no. However, later he was operated on. The deep cells were practically free, but at the point of tenderness pus was found and the sinus was covered with black granulations, but it was not opened. The temperature dropped to 102° but ran up again. Then Dr. Rae suggested further operation, so Dr. Haskin opened the sinus, but no thrombus was found. The patient's temperature dropped again for a short time, and it went up again two days later, as typical septic temperatures do, to 105° and 106°. They never got the positive culture. The boy was then given leucocyte extract for five days and the temperature dropped to normal. It was then stopped for five days, when the temperature again showed sepsis, but no bacteremia was found.

The extract was again given for three days and the patient recovered.

DR. DWYER said that the presence of the colon bacillus in chronic ears had been reported by various observers. He himself had had several cases, and there were undoubtedly more in his series, as sometimes the organism was classed in with the group of Gram negative bacilli, included in which is the bacillus mucosus capsulatus, the bacillus of Abel, etc., and the work of Fitzgerald of Toronto, done on the latest biometric methods, would seem to point to these all being members of a common family.

He was very glad that Dr. Libman was present to take part in the discussion, as so much work had been done by him along these lines. He purposely had not gone into the transmutation of type organisms, as, to his mind, the main reason for reporting the series was to bring out the importance of blood cultures for practical diagnosis.

The case of which Dr. Haskin had spoken, in which three blood cultures had been taken, was desperately ill. In the second case they could find no thrombus. There was no doubt as to the efficacy of the extract in these three cases. The results are very often striking.

He wished to thank Dr. McFarland for coming to take part in the discussion.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, Held April 20, 1915.

DR. GEORGE W. BOOT, THE PRESIDENT, IN THE CHAIR.

Case of Crushing Injury of Face.

DR. GEORGE W. BOOT exhibited a man who had met with a crushing injury of the face ten years ago, which resulted in complete loss of the nose. The man came to the County Hospital with the history of having met with an elevator accident ten years ago. The jaw was fractured on the right side. Four weeks after this accident the nose began to decay, which process continued for five years. During the last five years there has been no extension of the process, and he has been in the state as seen at present. The right eye has been removed. The nose is completely gone. The turbinates have been completely destroyed; the septum has been destroyed. The left eye is turned inward. He has only perception of light and ability to count fingers with the left eye. The patient is anxious to have his vision restored, but does not care much about the nose. Dr. Boot thought the case must be one of osteomyelitis. The man is married; has seven children, the youngest three years of age, all perfectly healthy. No history of primary lesion. Dr. MacEwen said it was not a case of lupus or epithelioma, nor did it look like a tertiary syphilis. The Wassermann reaction was faintly positive. The interesting part of this case is the extensive destruction of the nose, septum, and turbinates, without involvement of either the hard or soft palate.

Destruction of Septum Following Syphilis.

The second case exhibited by Dr. Boot was one of destruction of the septum following syphilis, and he brought this patient to the meeting to show the contrast. In the first case one particularly interesting point was the ability to see the action of the soft palate, which completely closes the nose from the throat.

Scleroma of the Larynx.

The third case had been shown to the society before by Dr. Friedberg. It was one of scleroma of the larynx. The patient has been in the County Hospital for several years. He had worn a tracheotomy tube for two years, or maybe longer, but within the last two or three months the tube had been removed, and the patient was getting along very nicely without it.

Demonstration of Glasses Used for the Observation of Nystagmus.

DR. J. GORDON WILSON showed the method he used in observing nystagmus. He employs large frames like those used in automobile glasses. These frames cover the eyes and are opaque, except in the center, where there is placed a lens of eighteen or twenty diopters. It is essential that the sides and the rims be opaque, to prevent observation of external objects. The patient cannot focus through these lenses. The advantage of these glasses is that the observer can watch all eye movements, which are magnified, while the patient is unable to focus. The first to use glasses of this nature in a modified form was Bartels. Dr. Wilson has found them of great value. They are made for him by Hardy and Company, Chicago.

Report of a Case of Intense Vertigo Relieved by Puncture of the Dura in the Neighborhood of the Internal Auditory Meatus.*

By L. W. DEAN, M. D.

DISCUSSION.

DR. J. GORDON WILSON thought the case, so well reported by Dr. Dean, was of great interest, not only in itself, but because of its bearing on the etiology of vertigo. Dr. Wilson saw a case a few days ago in which he had operated twelve months ago for a cyst in the neighborhood of the internal auditory meatus. As in Dr. Dean's case, one of the most prominent symptoms was vertigo. After the operation and relief of pressure the vertigo disappeared and so far has not returned.

In such cases it is interesting to inquire into the etiology. This seems to be satisfactorily explained by the anatomic

*See page 867.

relations of the vestibular nerve. A process of the arachnoid space with the cerebrospinal fluid passes along the eighth nerve into the internal auditory meatus. It lies in close proximity to and is probably connected with the lateral foramen which connects the fourth ventricle cerebrospinal space with the subcerebellar cerebrospinal space. Cysts in this region are usually connected with some faulty circulation of the cerebrospinal fluid. Such a faulty circulation may arise from a previous inflammation of the meninges resulting in adhesions, or from an injury to the skull, but in a certain number of cases there is no distinct history of damage. As a rule, immediate relief is obtained by opening the cyst, though the possibility of its refilling must not be overlooked.

The question of pointing, to which Dr. Dean referred, is a question very much with us at present. We know so little about this subject that one must at present keep an open mind. It is, however, well to remind enthusiasts that pointing is a cerebral act and not a cerebellar. Further, in pointing with the eyes shut, one depends on memory for the knowledge of the locality of the object, and memory is also a cerebral function.

DR. GEORGE E. SHAMBAUGH stated it is interesting to note, in connection with the clinical phenomena in cases like the one reported by Dr. Dean, that the disturbance produced apparently by pressure in the region of the vestibular tract in the cerebellum produces symptoms not very unlike those which arise from certain forms of labyrinth involvement. A labyrinthitis which does not result in a suppression of function gives rise to a nystagmus directed toward the affected side, apparently due to an increase in the labyrinth tonus. A labyrinth involvement which proceeds to a suppression of function, results in a nystagmus directed toward the normal side, produced apparently by a suppression of tonus in the affected labyrinth. Now, if the infectious process proceeds to an intracranial involvement, such as a collection of fluid in the region of the cerebellar pontine angle, a nystagmus is again produced which is usually directed toward the affected side, just as if it might be due to an irritation of the trunk of the vestibular nerve; in other words, giving rise to exactly the same type of nystagmus as results from an irritation of the nerve endings in the semicircular canals.

Dr. Shambaugh recalled a case which was under his care several years ago because of an extensive cholesteatoma and labyrinth involvement. In this case the labyrinth operation was performed at the same time as the radical mastoid for the relief of the cholesteatoma. About a year later the patient developed symptoms pointing toward an intracranial lesion, had a great deal of headache and spontaneous nystagmus directed toward the affected side. An operation was performed exposing the dura in the posterior fossa, in the region of the internal meatus. This was incised and a small amount of fluid, apparently cerebrospinal, escaped. This case went on to recovery and the vertigo and nystagmus disappeared.

DR. JOSEPH C. BECK was exceedingly pleased with the report of Dr. Dean, and wished to ask some questions.

First, the collection of fluid in the region he described, or suspected it came from, should have given Stellwag's symptoms, such as found in hysteria or tumors in the pontine cerebellar angle. Dr. Dean had said the fields were normal. That was interesting, in contradistinction to the cases reported, where there was such a large amount of fluid without locality.

Second, he did not hear any report as to the fundus oculi. Were there any optic disc changes?

DR. DEAN said that both fields and fundi were normal.

DR. BECK said that the third point he wished to refer to was the question of pain. Was there much headache?

DR. DEAN said that just in the last few weeks the patient had a dull headache, during attacks, in the region of the posterior fossa. There was no pain, however, on pressure over the opening of the mastoid vein, as mentioned by Rodman.

DR. BECK said it is claimed, in a paper by Bruggiere, based on examination of the spinal canal in internal hydrocephalus, that the only explanation of the absence of pain in a cyst or fluid accumulation which communicates with the spinal canal is that there occurs a sort of artificial syringomyelia, or spina bifida, and that, of course, the doctor could not prove in his case; but that probably explains why there was not more pain with such a large amount of fluid present.

DR. J. HOLINGER wanted to thank Dr. Dean for his paper and to call his attention to the report made by the speaker at the International Congress in Boston of a case that at that time he considered a tumor of the cerebellar pontine angle.

The symptoms in that case and the conditions found were practically a repetition of what Dr. Dean had said, with the only exception that in Dr. Holinger's case there was severe headache from the start—constant headache. After the first operation he was still of the opinion that he had to deal with a cyst. Quite a lot of fluid was discharged. The patient was improved for about three years. Then she got worse again, and, acting on the presumption that he had to deal with a cyst, he advised a secondary operation, with the intention of removing the cyst. At operation, on opening up the first flap the tumor appeared and burst before a picture of it could be made. Then it was seen that the condition was an internal hydrocephalus. The patient did pretty well for several days, but then got worse and died. The speaker had a complete postmortem of the brain; he has the brain and the temporal bones from the case.

DR. HOLINGER thinks that these differences in secretion of the cerebrospinal fluid are a chapter that otologists will have to help to solve. We cannot expect very much from the nerve specialists. In his case a very prominent nerve specialist gave him the absolute assurance that there was no positive sign of any brain lesion. Nevertheless, all the symptoms of dizziness and changes in the static labyrinth were present.

DR. J. R. FLETCHER thought that perhaps there is some advantage in grouping these cases more or less. He had urged Dr. Kahn to again call the attention of the society to a case he had, but as he would not speak of it, the speaker would mention it in some detail. In this case the individual had received an injury sixteen years before, striking his head in diving, and from the further history seemed to have fractured the skull. From that time hearing was entirely lost in the right ear. Afterwards there was a discharge from the ear up to the time he came to the Michael Reese Hospital. Latterly he suffered from attacks consisting of the loss of his sense of strength, and he felt as though something had suddenly occurred to him to make him unable to walk straight or to lift, or do many things requiring ordinary strength. He was exceedingly dizzy and had headaches. On further examination it was found that he had a depression of temperature, with lowering of the pulse. The temperature went down to 96.5° ; pulse down to 52, and respirations were more reduced.

He had no symptoms of a cerebellar disease except one, and that was the exaggerated knee reflex on the same side. He had nystagmus to the diseased side, exceedingly small, rapid, rotatory nystagmus, easily seen when the eye was slightly shaded. He had pain on percussion over the area, and had been complaining of severe headaches during these attacks, which lasted over long periods—they were not a matter of a few minutes, but days or even weeks, growing somewhat better from time to time. The diagnosis was made of abscess in the period of latency in the sphenotemporal fossa, that meaning, of course, a cyst. Dr. Kahn, after doing a radical mastoid, which was necessary, punctured this area, aspirated it and withdrew just exactly what Dr. Dean mentioned—somewhat bloody fluid, rather brown in color. That gave further light on the matter, and the conclusion was arrived at that these attacks were due to hemorrhage into the cyst, that hemorrhage causing indirect pressure (of course, pressure being the main thing) on the posterior fossa. The condition was proven out by a second operation, in which Dr. Kahn absolutely located and explored this cyst. This man has made a complete and absolute recovery, with the exception of the hearing, which had been totally destroyed at the time of the accident, which had occurred, as stated before, sixteen years previously.

It would seem, judging by this case of Dr. Kahn's, and also Dr. Dean's reported case, that the time is limitless in which these cysts may last. They may continue indefinitely if they have not become reinfected, which brings on again the manifest period of an old abscess.

DR. DEAN, in closing the discussion, simply wished to say, in answer to Dr. Beck's questions, that he believed they were all accurately answered in the paper.

Theories Concerning Paraculis Willisii.

BY GEORGE M. McBEAN, M. D.

DISCUSSION.

DR. GEORGE E. SHAMBAUGH stated that the facts in regard to the phenomenon of paraculis Willisii are very definite. A person with normal hearing experiences some difficulty in

*See page 874.

hearing when in a noisy place; a person with nerve deafness finds increased difficulty under these circumstances. On the other hand, certain cases of deafness are very much better in a noisy place. In these cases the deafness is always due to fixation of the sound conducting mechanism, and the phenomenon is most marked where this fixation is most complete; that is, where there is bony ankylosis of the stapes.

Two possible causes suggest themselves: First, that the commotion produces a stimulation of the sound perceiving apparatus, thus making it more sensitive than normal; second, the commotion in some way improves the action of the sound conducting mechanism. Dr. McBean accepts the first view. This may be the correct explanation, and yet it does not entirely explain all the phenomena. For example, a person suffering from deafness due to fixation of the stapes will often hear much better on a moving train than does a person with normal hearing.

There is another phenomenon in connection with these cases of paracusis which is just as interesting and just as difficult to answer. This is the prolongation of bone conduction. The two are always associated, and the speaker is inclined to believe that could we have an accurate explanation of the one phenomenon, we would have an explanation of the other. The explanation of prolonged bone conduction in obstructive middle ear deafness which has been given by Bezold seems to be the most rational. His explanation is simply this: All sound waves which are capable of perception must pass through the stapes. When the stapes hangs suspended from the oval window by its normal ligaments, the impulses from a tuning fork placed on the skull are not transmitted as readily to the stapes as when this structure becomes more firmly adherent, either by bony or fibrous adhesions.

The speaker cannot get away from the idea that the phenomenon of paracusis Willisii has perhaps more to do with the sound conduction than with sound perception. It seems to him more rational to believe that the sound perceiving mechanism remains the same with the stapes locked up as with it freely movable. With the stapes fixed in the oval window a person has better bone conduction than a normal person, and associated with this phenomenon is the paracusis Willisii, whereby the person with defective hearing is often able to hear

even better in a noisy place than a normal hearing individual.

DR. J. GORDON WILSON had listened with great interest to Dr. McBean. In a paper on so difficult a subject Dr. McBean could not expect but that some member would disagree with his ideas. Its solution is of importance to otologists and must be based on the physical laws of sound conduction.

Dr. Wilson is not convinced by the arguments of Dr. McBean in regard to the cause of paracusis. He cannot see how we are going to explain the condition of paracusis by any mechanism in the cochlea. On the other hand, Dr. Wilson believes the laws of acoustics can be applied so that paracusis Willisii may be explained by faults in the middle ear mechanism. It is worth while noting that not all errors in the conducting mechanism give the symptoms of paracusis. We do not get it in cases where the stapes is fixed by masses of bone lying in the oval fossa, nor do we find it if the middle ear be full of fluid.

The popular idea in regard to paracusis is that a loud noise shakes and loosens up the adhesions of the ossicles, and to some extent enables the sound vibrations to go through with less friction. There is some basis of truth in this. In otosclerosis there occurs an inhibition or diminution in the amplitude of the movement of the stapes. Along with this we have a diminution in the hearing of low tones. On turning to the acoustic properties of sound waves, one finds that in harmonic vibrations, when mass and amplitude are fixed, the same energy may be obtained by high notes with small amplitude as can be obtained by low notes with great amplitude. We know that this is true in otosclerosis, for we require notes of greater amplitude or loudness to overcome this inhibition.

When we pass from this relatively simple fact to the consideration of the superimposing of one sound wave on another sound wave, the subject becomes more complex, but it is along these lines that Dr. Wilson believes the explanation of paracusis to lie. If when sound waves of low frequency are passing through ossicles which are restricted in their movements and there are superimposed on these sound waves of higher frequency, the latter will pass to the labyrinth with less loss of energy, and therefore be better heard.

DR. ROBERT SONNENSCHNIG asked Dr. Wilson if the energy displayed by low tones of great amplitude is the same as that

of high tones with a small amplitude. Why is it that a high pitched tuning fork is heard better by air conduction than by bone, as explained by Schaeffer and others as being due to the fact that the handle of the fork has a much smaller amplitude than the prongs? With the monochord the very high tones are heard better by bone than air conduction.

DR. WILSON, in reply to Dr. Sonnenschein's question, pointed out that what he had said had to do with conduction through the air and the ossicles. Conduction through the bone was a separate problem, involving the question of resonance, and had nothing, so far as he could see, to do with the question of conduction through the air and the ossicles. He could offer no suggestions in regard to the apparent anomaly presented by the monochord.

DR. McBEAN, in closing the discussion, was very glad that Dr. Sonnenschein had brought up the subject of the monochord. He has an interesting case at the present time, whom Dr. Shambaugh saw several years ago, and diagnosed as otosclerosis, who had just come back to the city, in whom the C_4 fork was short fifteen seconds in the right ear, and twenty seconds short in the left ear, and yet he heard the monochord E_6 by air in the right ear, and by bone, F_7 . He heard an octave and a tone higher by bone in the right ear; in the left ear, D_6 by air and F_7 , an octave and two tones higher. It has been a very interesting case to the speaker. It seems reasonable to suppose that the nerve is not degenerated at all, but merely out of function for the upper tone limit by air because of loss of mass vibration in the endolymph. The accepted theories do not explain the condition.

Dr. Shambaugh spoke of patients with otosclerosis hearing better in a train. That is, they hear better than a normal person during the noise, but the normal ear hears better in the quiet. That is the point Dr. McBean wished to make, that a normal ear is overstimulated by the gross vibrations, so does not hear so well, while the ear with stapes ankylosis has its lymph artificially vibrated into something approaching its normal condition. A noisy place to a normal ear is Bedlam, but to an otosclerotic is a haven of peace.

Paper: The Postoperative Antiseptic Treatment of the Tonsillar Fossæ.

BY GEORGE PAULL MARQUIS, M. D.

DISCUSSION.

DR. ROBERT SONNENSCHNIGER could not say anything regarding the value of the method described by Dr. Marquis, as he had never used it, but it has always seemed to him that in children particularly there is very little discomfort after operation. In adults, on the other hand, there is considerable soreness. He has, however, always been of the opinion that it is the best surgery to leave any fresh wound alone.

DR. H. KAHN said that Dr. Marquis had spoken to him about this treatment some time ago, and that since then he had had occasion to operate on seven adults. In all the cases the results have been very satisfactory. In the first two cases he applied the alcohol and iodine to both tonsillar spaces after the removal of the tonsil, and there was practically no pain on the second day, and very little pain during the whole process of healing. In order to test the method out, he applied the alcohol and iodine to one side only, and left the other without any application. In each case in which he did this, the side to which the alcohol and iodine were applied caused very little distress to be complained of, while the other side was profoundly painful. He felt that these tests were quite conclusive as to the value of the method.

DR. JOSEPH C. BECK said that the question of exudate in these cases was exceedingly interesting to him. Although perhaps out of order, he wanted to say a few words with reference to the exudates that follow nasal operations. He has been worrying a good deal about their cause. He has always observed quite a bit of this whitish exudate after tonsil operations in children as well as in adults, and he has always treated them with iodine, applied the day following operation, but never just at the time of operation. He was exceedingly thankful for the paper of Dr. Marquis, and would immediately try his method.

He would have liked to hear the result of the bacteriologic examination—just what organisms were found in the exudate

*See page 880.

above referred to. He has been practically unable to find any organisms in the exudates following nasal operations.

The speaker had the pleasure of seeing a case of Dr. Marquis' shortly after operation, and in this case there was practically no reaction, whereas if this case had been treated in the way he (Dr. Beck) usually does, there would have been a great deal more reaction present. It certainly seemed to be an excellent suggestion.

DR. MARQUIS, in closing the discussion, in reference to Dr. Sonnenschein's remarks, said he used to think just as he does, but he found that the method as outlined seemed to give a great deal of relief, and he thinks the main thing is to give relief from pain.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL
SOCIETY.

Regular Meeting, Held Monday, May 24, 1915.

DR. GEORGE W. BOOT, THE PRESIDENT, IN THE CHAIR.

**Demonstration of Frontal Sinus Cases Operated Intranasally—Cases
of Lateral Sinus Thrombosis.**

DR. R. H. GOOD said there was only one point he wished to demonstrate regarding frontal sinusitis, and that was that cases with pus breaking through the bony walls, either on the forehead or in the orbit, heretofore having been considered as cases that should be operated extranasally, will get well when operated intranasally, which point he would demonstrate to the members by the exhibition of several patients.

The first patient shown had severe headaches a number of years ago, with frequent swelling just above the eyebrow, near the median line. About two years ago she came to Dr. Good with an acute frontal sinusitis, with somewhat of a swelling in this same region, and he tried everything in the line of medical treatment, without relief to the patient. Finally he removed the middle turbinate, which seemed beneficial at the time. His experience with removal of the middle turbinate in cases of acute frontal sinusitis, however, has not been very satisfactory. In this last attack he tried frequent suction, after cocain and adrenalin sprays, and so forth, but the patient got gradually worse. The patient was incapacitated. He finally operated, which was followed by immediate relief from pain and a disappearance of the swelling. The pus had broken through the anterior sinus wall. The operation was performed intranasally and drainage established.

Case 2.—In this case there was no question that there was pus underneath the periosteum, with marked swelling of upper lid. The intranasal operation was performed, and the pain disappeared altogether. It took a few days for the eye to open to its normal size and condition. The sinus was washed out ten or twelve times.

Case 3.—In this case also the pus had broken through the

bony wall of the sinus. This was one of the most interesting cases the speaker has had. When he first saw the patient the left eye was pushed partly out of the socket. The tissues above the eye were so swollen that it was impossible to open the eyelids. The patient was confined to bed. As the ordinary patient with sinusitis is not confined to bed, this made him think that he had to deal with a very serious condition, and he advised operation immediately. The patient had to be taken to the hospital in an ambulance. He did the intranasal operation and got very nice drainage. However, the patient did not get well. He continued to have subnormal temperatures, occasional vomiting; inability to concentrate the mind, and he could not feed himself. The diagnosis was made of extradural abscess. Operation showed a perforation from the sinus into the orbit, but the posterior wall was absolutely solid, and no perforation. Dr. Good then opened up the posterior wall, removed an area the size of a quarter of a dollar, and got at least a dram of pus. The point he wished to bring out was that the pus did not go through the posterior wall of the sinus but came into the orbit, and then went back between the periosteum and the bony orbit, through the posterior orbit, and then came forward under the dura. That was the only way he could explain it being in the extradural space. This patient would also have been cured by the intranasal operation, had he not had the extradural abscess. There is no discharge at the present time, and the patient is feeling fine.

Case 4.—This case the speaker was very proud of, and had expected to show the patient, but had received a letter that she could not come. She is a doctor's daughter, who had had a frontal sinusitis for seven months, with a fistula opening just above the inner canthus of the eye. He showed the picture taken of the case when first seen, showing the sinus just above the inner canthus of the eye. He operated on this patient, and in twenty-four hours she had absolutely no discharge from the fistula, and at the present time it is still closed—a year and a half after operation—so that a sinus draining from the frontal sinus is not a contraindication to the intranasal operation.

Case 5.—This patient also developed an abscess just above the inner canthus. It broke open. He did an intranasal operation with some difficulty. This healed, draining through the

nose, and the patient got perfectly well. There is a slight scar, which can be seen on the picture.

Case 6.—This is a lateral sinus case. The patient developed an acute rhinitis. He left his work with chills. Later developed an acute otitis media in both ears. He was sick for four days before the membranes ruptured. He was treated for about a week with the usual treatment of a general practitioner, but the patient got worse and worse. The tongue was coated, poor appetite, temperature slightly elevated at times. The speaker was called at the end of a week. He could not elicit any tenderness over either mastoid. There was no tenderness along the sinus. The discharge was most profuse from the left side. He had the patient put in the hospital and had the temperature taken every hour, which he has found very valuable in making a diagnosis of lateral sinus thrombosis. After two days there was no question as to the diagnosis—it was a lateral sinus thrombosis. It is very important in these cases to watch for chills. Sometimes these patients do not have real chills—just the hands and feet will get cold, or the patellar region will get cold or damp. In this case, after the temperature went up to 104° , he had chills and perspiration; also some projectile vomiting.

Dr. Good has only had five cases of lateral sinus thrombosis in his practice. He gave the details of the operation performed in this case. The patient is getting along very nicely. In operating he has noticed that in every case where he has simply ligated the internal jugular vein it ruptures in three to five days after it is tied. He believes it is wise to separate the vein and sew the upper end into the wound, so that it can be irrigated through and through.

This patient had a leucocytosis of eighteen thousand; the polymorphonuclears were eighty-five per cent. Autogenous vaccines were given throughout the entire course of treatment in the hospital.

Dr. J. C. Beck asked what organism.

Dr. Good replied that it was the staphylococcus aureus.

Case 7.—This was another case of lateral sinus thrombosis, and in this patient you could see the mastoid region bulging. He was treated in a dispensary for five or six weeks, and was not operated because there was no discharge from the ear at any time. There was never the least disturbance with hearing

of which the patient knew, and yet there was a lateral sinus thrombosis. The infection did not go through the jugular bulb because the sinus was perforated in the mastoid region. On opening the mastoid the lateral sinus was found thrombosed, with a large perforation. In addition, there was an extradural abscess. When the mastoid was opened the pus came out of the cranial cavity, with pulsations. Today the patient has perfect hearing. In this case there was no perceptible systemic infection, and the patient recovered nicely.

Case 8 was the case of a nurse who had had an acute tonsillitis, which was treated by a general surgeon in a hospital. Four days after, she developed an acute otitis media, with tenderness over the mastoid. At this time the speaker was called. He did a paracentesis, and there followed a profuse discharge from the ear—about a cupful in two hours' time. He gave her urotropin, and so forth, in the hope that the condition would subside, but four days afterwards he realized that the mastoid was becoming more tender, and so he performed a mastoid operation. He found the lateral sinus uncovered, the bone necrosed over the sinus over a small area, but he did only a complete simple mastoid operation. Within a week she had distinct symptoms of lateral sinus thrombosis. The lateral sinus was operated on, the internal jugular ligated. There was no pneumonia at any time, and yet she had multiple abscesses all over the body, about fifty in number. Patient recovered in six weeks after last operation.

(Lack of time prevented Dr. Good from describing these cases in detail.)

Growth in the Left Choana.

DR. NORVAL H. PIERCE said this man complained two months ago of nasal stoppage on the left side. There was no pain of any consequence. On examination the speaker found that the left choana was deformed by a growth which apparently sprang from the immediate vicinity of the posterior end of the inferior turbinated body. When first seen there was no ulceration, but an induration in the region approximately close to the inferior and middle turbinated body. This infiltration could be very easily seen to travel upwards toward the upper portion of the eustachian tube. The second time the speaker saw him, some days after, there was a distinct increase in this infiltration, and at that time the infiltration had

what he determined to be a slough on its upper portion. The turbinated bodies were then so amalgamated in the left choana that he could hardly distinguish between the posterior end of the septum and the middle and inferior turbinated bodies. The growth apparently was very rapid. He succeeded in snaring off a portion of what he considered the most prominent portion of the growth, about the size of his fingernail. This was submitted for pathologic examination, and showed nothing but granulation tissue. Toward the circumference of these pieces of tissue he found something that was rather suspicious of epithelial growth. The pathologist was not sure whether it was epithelium or endothelium, but could see nothing that he could positively state to be malignant in its character. The man had no history of syphilis, but in order to insure the absence of this disease he was put on antisyphilitic treatment, with absolutely no effect on the growth. Tonight, on examination of the postnasal space, this infiltration was found to have spread rapidly over the posterior wall of the posterior pharyngeal space as a large ulceration with heaped up edges.

This is the second case of the kind that Dr. Pierce has seen in this region, and they all go about the same way.

X-Rays of an Interesting Case of Foreign Body in Nose.

DR. PIERCE was unable to show these plates, as they had been taken from the hospital in order to have photographs made of them. The case had been referred to the clinic by the school officials for the purpose of having the tonsils and adenoids removed. The tonsils were found to be healthy, and there were no adenoids. The child could not breathe through the nose properly. On the right side there was considerable swelling and discharge of pus. A foreign body could not be seen by anterior or posterior rhinoscopy, but the X-ray showed a large safety pin somewhere in the posterior portion of the nasal cavity.

Case of Nasal Deformity From Syphilis, With Suggestions as to Remedying the Defect.

DR. PIERCE said that the deformity had resulted from a syphilitic process which had healed up. In this case the Wassermann was negative. The next proposition, however, was

to improve the man's appearance. Dr. Pierce's idea is to take the middle finger of the left hand, split it up and sew the split finger into the cavity in this way (indicating). This is not the usual technic, but he thought it might be successful. He wanted to know if any of the members had any suggestions to make regarding the case.

Case of Frontal Ethmoidal Disease Operated on by the Killian Method, With Accentuation of an Important Point.

DR. PIERCE said that in this case the whole temporal region was very much swollen. The patient was shaved very thoroughly before he saw her on the table, and therefore he could not tell where the eyebrow was. Since the operation the eyebrow has sprung out very beautifully, over an inch above the incision. This displacement was the result of the great swelling present. The point is very important that in these enormous swellings it must be that the attachment of the orbicularis and the occipitalis has become entirely eaten away from the bone; the muscle contracts and throws the soft parts upwards. He has never seen this fact brought out, however, and exhibited the case because of its interest.

Case of Acute Frontal Abscess.

DR. PIERCE also showed a case of acute frontal abscess, with violent pain, which continued for many weeks. The patient was sick for about five weeks. In operating, he went in through the ethmoid, up into the frontals. The patient is feeling better now. The pain was greatly relieved by this intranasal operation.

DISCUSSION.

DR. J. HOLINGER asked if it was an especially deep frontal sinus, as shown by the X-ray.

DR. PIERCE replied that he did not think it was especially deep, and he did not think there was anything special about the X-ray other than that it showed that the sinus was diseased.

Case of Paralysis of Vocal Cords of Doubtful Origin, Probably Lues.

DR. CHARLES H. LONG said the interesting point about this case is its cause—whether it is tubercular or luetic. He exhibited the X-ray plates, which showed the external laryngeal

on each side, demonstrating the difference. The patient is fifty-five years old, and came to the speaker last January on account of the loss of his voice. Otherwise he was apparently in good health. The past history is that in 1907 he came under Dr. Walter Barnes' care for what seemed to be tuberculosis of the lungs. He had some hemorrhage, slight cough, some expectoration, and epileptiform fits. He told Dr. Long that these fits extended over a period of eighteen months. The hemorrhages were not like the ordinary lung hemorrhages. They came on after doing some strenuous work, and were only three or four in number. Dr. Long spoke to Dr. Barnes over the telephone about the case, and he said that he had had a tuberculin test made when the man was under his care, and had the sputum examined, both of which were negative. The patient recovered under antisyphilitic treatment. Dr. Barnes was of the opinion that it is a case of lues. The man was perfectly well until 1912, when he had an attack of sciatica which laid him up for four weeks. One day last November, when he got up in the morning he could not talk. This condition continued until he came to the speaker in January. A tuberculin test at that time was negative. He was put on antisyphilitic treatment, and a Wassermann was made. The Wassermann showed twenty-five per cent positive. He was given salvarsan. Then an examination of the lungs was made.

The interesting feature in this case is the differential diagnosis of the man's lung condition. He has had a positive Wassermann test, so it was necessary to consider the possibility of lung syphilis. The diagnosis is not by any means easy in the fibroid stage of either disease. We know that a positive Wassermann may be found in a tuberculous individual, without evidence of syphilis being present. We know that syphilis is one of the predisposing factors in tuberculosis. This man may have both syphilis and tuberculosis. The physical examination of the left apex posteriorly shows a mildly active lung lesion—undoubtedly tubercular. No evidence was found of active trouble in the right lung; no râles present, which could be accounted for by the fibroid condition of the affected portion of his right lung.

Syphilis of the lung is a comparatively rare disease. This man's condition is much more suggestive of tuberculosis than lung syphilis. He has had no temperature, pulse normal; dur-

ing the last winter lost about fifteen pounds in weight; no cough, no night sweats, none of the symptoms of tuberculosis. As stated before, he has had salvarsan, and is now taking forty grains, t. i. d., of iodid potassium. He has had inunctions, and says that he is gaining about a pound a week.

The diagnosis made by Dr. Long was syphilis, partly on account of the treatment by Dr. Barnes and the improvement that has taken place under antisyphilitic treatment. The voice is improving, which improvement began about six weeks ago. Of course, the left cord was the one affected, and it might be that three, four or five mediastinal glands might be enlarged because of this, but no other glands were found. The picture does not show any consolidation on the right side, and there is a picture of consolidation on the left side.

DISCUSSION.

DR. KEITH asked what the cords looked like.

DR. LONG said that there was just a paralysis of one cord. This man's mother died of tuberculosis or some lung trouble, of three or four months' duration.

Case of Laryngeal Tuberculosis.

DR. LONG then showed a patient, thirty-nine years of age, who has had sore throat almost all his life—up to about four years ago. Since then he has been free from it until last summer. Then, his throat being again sore, he consulted a physician, who said the tonsils should be removed. This operation was performed successfully in November, and about three or four weeks after that he commenced being hoarse. His hoarseness has persisted ever since, although fluctuating somewhat. Otherwise, he has enjoyed perfect health. There have been no indications of lung trouble. His father died at thirty-six with some lung trouble. Was sick for three or four months, and patient thought it was pneumonia. Dr. Long had this patient's chest examined by Dr. Cole, who stated that there was nothing found. There has been an ulceration of the mouth, several ulcers of the tongue, and ulcers of the pharynx. These were examined microscopically, and the report of the pathologist was necrosis with cell formation. Bacteriologic examination showed pneumococcus and streptococcus formations. Epithelial cells found. One peculiar thing is that these ulcers

in the mouth improve and new ones form. Wassermann test negative. Tuberculin test positive.

On the strength of the positive tuberculin test, the laboratory report, and there being no improvement from treatment, as well as the voice still remaining hoarse, and the recent discovery of two lymphatic nodes, one on each side, the speaker was led to the belief that the condition was one of tuberculosis. The patient does not believe it possible that he has tuberculosis, because otherwise he enjoys such perfect health. Dr. Freer had seen this patient with Dr. Long, and had agreed with him that the ulcers in the mouth were of tuberculous origin.

Case of Double Cerebellar Abscess, With Recovery Following Operation.

DR. BURTON HASELTINE said that the patient had presented very interesting clinical points. He was inclined to believe that there has been no report in the literature of a bilateral cerebellar abscess with recovery. This case followed an acute infection of the right middle ear. The boy is about eighteen years old, in good health previous to the time of getting a grippal cold, which was accompanied by considerable purulent rhinitis, rather quickly followed by an acute suppurative inflammation of the right middle ear. This ear complication was untreated. There was spontaneous rupture of the drum, with very free purulent discharge for about three weeks. There was considerable swelling of the external ear, and, as described by the family, this was present in front, upward and back of the auricle, suggesting a mastoid condition. The patient was first seen by a physician some five or six weeks after the beginning of the ear trouble, when he began to have vertigo and difficulty in walking. The physician told Dr. Haseltine that at this time the boy had a tendency to fall. There was some vomiting and the usual symptoms suggestive of cerebellar trouble.

Dr. Haseltine first saw the case on January 26th, at which time the patient was in bed, being unable to walk, and also having the appearance of sepsis, combined with a subnormal temperature of about two degrees. The pupils were widely dilated, equal on both sides. No reaction to light. Moderate amount of optic neuritis—equal on both sides. Mental con-

dition perfectly normal, except that there was some delay. Coordination about the same on both sides. Could not stand without falling, and at that time fell to the right. Had had several attacks of spontaneous vomiting. Nystagmus on looking either to the right or left side—rather marked, but not on looking straight ahead at this time.

A clinical diagnosis was made by Dr. Haseltine of abscess of the right cerebellum, and it was advised that he be brought to Chicago. On his arrival here the boy was very much better. Dr. Grinker was then called in consultation, and he made a very extensive examination. At that time the blood examination showed only nine thousand white count; red cells about normal, with a lymphocytosis both absolute and relative to a mild degree. Temperature came up to normal. For seven days he was kept in the hospital under observation. Tuberculin test negative. Temperature about normal. No particular change in the symptoms. On the seventh day he developed labyrinth symptoms for the first time, with distinct rotatory nystagmus. The right labyrinth did not respond to the caloric test. Hearing apparently normal in the right ear. Normal reaction to caloric test on left side. The mastoid showed absolutely no symptoms except a slight difference in transillumination, the right being a little darker. There was no pain. Middle ear normal in appearance. Drum head had spontaneously ruptured, as stated above, and the discharge had ceased.

When the labyrinth symptoms developed, operation was performed on the mastoid. The dura was exposed and the mastoid cleaned out. The cells were dark, but not broken down. Culture showed the staphylococcus aureus. The labyrinth was exposed, but the speaker did not open the upper nodules. Forty-eight hours after this mastoid operation the temperature was normal, the rotatory nystagmus had diminished, pupil dilatation was decidedly less, and all the symptoms were better. Six or seven days following this the cerebellar symptoms returned, and on the eighth day the speaker opened the cerebellum. This patient had some bilateral symptoms. The right sphenoidal bone was explored and nothing was found. An opening over the right cerebellum released a large abscess. Examination showed a practically pure culture of the yellow staphylococcus.

This operation was followed by immediate improvement, and after seven weeks, with the usual drainage, he was allowed to leave the hospital, although there was still some drainage. Five days after leaving, the temperature suddenly went up to 104° and the symptoms returned. He was taken back to the hospital, the canal dilated, and a probe inserted to the bottom. At the depth of four and one-quarter inches there was some bad looking tissue and a small amount of pus. He then took an X-ray picture with the instrument in the wound, and was surprised to find that the end of the probe was over in the opposite hemisphere. He then had some silver tubes made, and met the problem of draining a left-sided abscess through the opening in the right side of the head. These tubes were cut off as the cavity became smaller. At the last rubber tubes were used for drainage, and then gauze. At this time there was still a canal of one and one-half inches, which was draining with a little gauze strip, but at the present time there was practically no discharge.

(NOTE.—As we go to press the patient is entirely well, the wound has closed, and he is able to go about his usual duties.)

DISCUSSION ON DR. HASELTINE'S CASE.

DR. JULIUS GRINKER said that on the day of his first examination he found the evidences of right-sided cerebellar disease. As there was a history of infection preceding the development of symptoms, earache and purulent rhinitis, with discharge, and some mastoid involvement, combined with a history of subnormal temperature and leucocytosis (twelve thousand), the speaker did not think there was any difficulty in diagnosing the case as cerebellar abscess. Patient was apathetic, slow in speech, thought and locomotion. He had bilateral cerebellar ataxia, more marked on the right side. There was nystagmus and double optic neuritis—not well marked, but sufficiently so to be recognized as such. Instead of the classical slow pulse, there was rather a small and rapid pulse. Temperature had a tendency to subnormal rather than elevation. The diagnosis of cerebellar abscess was made by Dr. Grinker, independently of Dr. Haseltine, who had previously made the same diagnosis. But from the symptoms presented it was questionable whether immediate operation on the cerebellum was justified without previous exploration of the inter-

vening territory. The history of mastoid trouble could not be disregarded. He agreed with Dr. Haseltine that it would be best to explore the mastoid first. The next question was as to the advisability of going into the cerebellum after the mastoid operation. Dr. Haseltine mentioned the fact that there were symptoms which did not indicate exactly a unilateral abscess. Those symptoms were: Exaggerated tendon reflexes on the right side, a phenomenon which does not fit in the picture of left sided cerebellar disease. In addition there was speech disturbance, suggestive of a mild type of aphasia. Aphasia, as is well known, is not produced by right sided trouble, the speech centers being localized on the left side. This made the speaker hesitate. He also thought that before going into the cerebellum it would be well to ascertain the absence of a meningitis serosa interna, which occasionally occurs in connection with pachymeningitis following mastoid disease, usually in the vicinity of a pus depot. A lumbar puncture was made, and the boy felt somewhat relieved after the withdrawal of a moderate amount of fluid which was under great pressure but showed negative laboratory findings otherwise.

The patient's symptoms continuing, the speaker advised exploration of the temporosphenoidal lobe adjoining the territory of the right mastoid, and in the absence of a depot of infection to proceed to the cerebellum. What use could it have been to operate on the cerebellum when perhaps a depot in the temporosphenoidal lobe was left to continue the work of infecting the brain? Dr. Haseltine then explored the temporosphenoidal lobe, which was found free from pus. It was then decided to enter the cerebellum at once, which was done, and a large right sided abscess discovered. Dr. Grinker had no idea that there was an abscess in the left cerebellum also until Dr. Haseltine some time later introduced a probe into the abscess cavity as far as it would go, and then had a picture taken. This showed conclusively that the probe had entered the other hemisphere. Dr. Haseltine then continued to drain more extensively until there was no more pus escaping. The result must be considered brilliant.

Dr. Grinker does not recollect having ever seen a cerebellar abscess which was bilateral in distribution—certainly not a bilateral abscess which proceeded to recovery—and he has seen

a number of cerebellar abscesses. He thinks the procedures followed in this case were conservative and at the same time radical. He remembered a similar case at the County Hospital, in which the symptoms pointed strongly to abscess in the cerebellum, and he diagnosed it as such and advised operation. As a matter of fact, the operator, after careful search, failed to find the abscess, and postmortem examination revealed the seat of abscess in the frontal lobe. There are real difficulties in the differentiation between cerebellar and frontal lobe disease, which time does not permit me to discuss in detail.

Another interesting feature in Dr. Haseltine's case was the symptom of frontal headache—a symptom pointing to the frontal lobe, but not rarely found in cerebellar disease, abscess, or tumor. The speaker has under observation a case, operated on by Dr. Ochsner a few days ago, in which he diagnosed an acoustic tumor, and in which the headache was never occipital, but almost always frontal in location. The explanation is that the frontopontine cerebellar tract has its origin in the frontal lobe. Oppenheim also speaks of cerebellar abscess causing symptoms referable to the frontal lobe. On the whole the surgical work in this case was cleverly executed by Dr. Haseltine, and neither he nor Dr. Grinker regretted that they had not proceeded faster. The moment the diagnosis was absolutely certain and other depots had been explored, the radical operation was performed. The case is also remarkable from the fact that it is possible to drain a very extensive abscess with but little trauma to surrounding tissue if one uses an unyielding tube of the proper caliber. Of course, much of the cerebellum has been destroyed. As a result there is still ataxia on the left side, but you see how much more extensive the ataxia is on the right side. Had the cerebellum been entered also on the left side, much more cerebellar tissue would have been destroyed. The young man still has a tendency to the drunken gait, and Dr. Grinker is certain that this would have been much worse had there been an additional opening in the other cerebellar hemisphere.

**Case of Recovery From Marked Hydrorrhea Nasalis of
Hysterical Origin.**

DR. JOSEPH C. BECK said that the first case was one of a young lady who had been presented to the society a year ago. At that time she had a marked hydrorrhea nasalis, and a diagnosis was made independently by Dr. Grinker and Dr. Beck that it was a hyteric condition. Some of the members considered it a much more serious condition, and not hysteria. Nevertheless, this patient was sent home shortly after she was presented at the meeting, and since that time has completely recovered without any treatment. Previous to that time she had had fifteen operations on the sinuses and throat. All she did after she left Dr. Beck's service was to take a long vacation with some friends, and Dr. Beck promised her that if she got well she could take up nursing. That she has since done at the North Chicago Hospital.

Necrosis of Nose Following Removal of Tear Duct.

The second case he wished to show was much more interesting and important, because it fitted in so well with Dr. Pierce's case. This man had tear duct removed on account of a swelling on the right side of the face, and following that his nose and right side of the face became very much swollen and a necrosis developed on the side of the nose. The diagnosis of lues was made. Wassermann faintly plus. He was treated vigorously with a number of neosalvarsan injections, large doses of iodids and mercury, with absolutely no result. At one time, however, it was thought that the condition might be tuberculous, and he received three treatments of deep X-ray therapy by the Coolidge tube, following which he was given salvarsan intravenously instead of neosalvarsan. The nose cleared up after this, and the speaker thought this proved that salvarsan and not neosalvarsan was the specific in this case. But that was only temporary. Dr. Beck then consulted Dr. Ormsby. Subsequent history showed the man was married and had two healthy children. There was absolutely no history of lues. Dr. Ormsby, after careful consideration, decided that it was a case of chronic septic infection of the nose, and should receive vaccines (which the patient had received

without much effect before) and also X-ray treatments. He was not given any more vaccines, but received eight deep X-ray treatments with the Coolidge tube, and the improvement was marvelous. He improved over night, so to speak.

The case was very interesting, in that all that the man complained of at first was a chronic dacryocystitis, for which he had an operation on the tear duct, which was followed by the necrosis. It had every evidence of a specific lesion, but treatment proved the opposite.

Case of Labyrinth Disease—Operation—Recovery.

Case 3.—This patient had measles as a child, and chronic bilateral suppurative otitis media, which was operated on, ten years ago. He was then considered absolutely deaf and was a pupil in Miss MacGowan's school for deafmutes. The speaker had operated him—a bilateral radical mastoid—and had then lost track of him until some weeks ago, when he came back to him with symptoms of severe headache on the right side. A suppuration from the region of the promontory was discovered, and a labyrinth operation performed. In this connection Dr. Beck wishes to state that both ears were negative to all tests as to a functioning labyrinth. He was absolutely deaf. He has a fair speech, characteristic of deafmutes, being a splendid lip reader. In cleaning out of the labyrinth Dr. Beck used one instrument, namely, the bur. He took out the entire labyrinth, saving the facial bony canal, with the happy result that the ear is dry, there is no facial paralysis, and the headaches are entirely subsiding.

Trifacial Neuralgia.

Case 4.—This man was operated by Dr. Ballenger for a radical frontal sinus operation. He has a depression over the frontal sinus, but complains of very marked pain. He now has a trifacial neuralgia, for which condition he has been promised relief by injections of the Gasserian ganglion. There is nothing to be seen except that the pain is intense. The man is frantic over the condition. It is on one side, and not classical of the condition, but Dr. Beck feels that all other things have been done except injection of the nerves, and so prob-

ably the treatment spoken of will be the only thing to do. He has subjected three cases to Gasserian ganglion injections, and it is one treatment that certainly offers a splendid opportunity for relief of such severe pain as these cases present. The result of the operation is all that one may expect—absolute freedom from pain. He really did not intend to show this patient as such, because he had not made a close enough study of his condition, having seen him in his clinic that day for the first time, but wished to show him in connection with another case of “looking for an operation patient.” There are some people who are running about from clinic to clinic to be operated upon, a sort of mania for it, and the second case he had hoped to show was a woman whose history showed that she had seen about thirty specialists in ear, nose and throat—mostly members of the society—many of whom had operated upon her. She has had a bilateral radical sinus operation, including externally, and both mastoids and tonsils. The additional interesting point is that the patient steals from other patients whenever she is admitted to the hospital.

DISCUSSION ON DR. PIERCE'S CASES.

DR. J. HOLINGER wished to say a word about a plastic operation of one wing of the nose in connection with Dr. Pierce's and Dr. Beck's cases. One wing of the nose had been destroyed by necrosis. The tissues of the face are very elastic. To cover the defect he made two slightly divergent incisions from the end of the defect backwards over the cheek, and loosened a large flap between the incisions. He stitched the bleeding base of the flap to the edge of the bony aperture of the nose. That gave sufficient loose skin tissue to cover the whole defect with a loose flap, which was well supplied with blood. There was absolutely no tension on the back of the nose, because the whole tension was right at the edge of the pyriform aperture. The flap fell in its place automatically. The cosmetic result in this case was very good. To improve the looks of the nose hole, he folded the end of the flap inward and stitched it loosely. The flap healed in nicely and smoothly. He thought this might offer a suggestion to both Dr. Pierce and Dr. Beck for a plastic operation. He saw the pa-

tient again three years after the operation. The nose looked very nicely.

DR. JOSEPH C. BECK saw the case Dr. Pierce presented about three or four days ago, and it looked to him like a sarcomatous condition of the nose. It might be an epithelioma or endothelioma, although these conditions certainly differ, at least microscopically.

In regard to the case in which Dr. Pierce was going to do a plastic, and also his own case, he did not know of anything better than the operation Dr. Pierce suggested doing—to sacrifice the finger. The loose flap would be a poor procedure. One of the necessary things is the preservation of the nasal side of the orbit. Any operation around that region which would loosen up tissues around the orbit would defeat the purpose. At the present time he is building up a nose by making an incision over the rib, severing the rib in two parts, leaving it in place and laying bare the finger over the front part, exposing the periosteum, placing the finger underneath the rib, and putting the whole thing in a plaster cast for immobilization. Ten days later resected the rib, when it remained hanging on the finger. He then treated this as an open wound, allowing granulations to form on the piece of the rib at this point (indicating). Now he expects to replant this finger with the piece of rib through the same scar over the chest wall, allowing it to heal in, thus obtaining a large skin flap. Blair, of Kansas City, has reported a number of these cases in *Surgery, Gynecology and Obstetrics*.

DR. PIERCE, in closing the discussion on his cases, said that he had very little faith in flaps derived from the side of the face bridging over such a large defect as that present in the case he had shown. The stitches pull out and the defect is just about as large after the attempt as before. He thinks the only way to remedy these defects is by means of some plastic operation by means of the finger or rib, as Dr. Beck described.

DISCUSSION ON DR. HASELTINE'S CASE.

DR. NORVAL H. PIERCE asked Dr. Haseltine whether the labyrinth has been tested out since the operation, especially the static apparatus.

DR. ALVA SOWERS, speaking for Dr. Haseltine, who had left the room, said that the labyrinth had been tested with the caloric and rotary tests about three weeks ago, and the static labyrinth was found to be still active.

Another point Dr. Sowers wished to mention was that no anesthetic was used during any of the operations.

DR. BECK asked if no anesthetic at all was used.

DR. SOWERS replied that he received one-sixth grain of morphin preliminary to the first operation.

DR. BOOT asked if no local anesthetic was used either.

DR. SOWERS replied in the negative.

DR. PIERCE said he might be mistaken, but he thought it was important to know whether the labyrinth responded to the caloric test before the abscess was drained. He had understood Dr. Haseltine to say that the labyrinth was normal both for hearing and the caloric test.

DR. SOWERS replied that the static labyrinth was negative. The acoustic labyrinth was normal. He could hear perfectly, previous to the operation. There seems to have been no change at all in the labyrinth except the rotatory nystagmus.

DR. PIERCE asked how the auditory apparatus was tested.

DR. SOWERS said they used a stethoscope, pinching off first one side and then the other, and whispering through it, so that there was no chance of malingering.

DR. GRINKER said he thought that was a very splendid test, and had never seen it used before.

DR. PIERCE asked if the noise apparatus was used at all.

DR. SOWERS said it was not.

DR. PIERCE said he could hardly think the man could hear so well with such a destruction.

DR. BOOT said he would like to know the origin of this abscess. Such abscesses are usually situated close to the temporal bone. This one was quite a distance from it. Was it by direct extension from the mastoid, or was it a metastatic process?

DR. GRINKER, replying to Dr. Boot's question, thought it was a metastasis—not direct continuity or contiguity—as all the intervening brain territory was found free from disease. We know that an abscess will travel quite a distance from the depot of infection. Cases have been described in which ab-

cess was found on the opposite side from the diseased area, but in the majority of cases we look for the abscess in the contiguous territory, on the same side. The most frequent site of otitic abscesses is the temporosphenoidal lobe; next in frequency the cerebellum, and very rarely the frontal lobe.

DR. BECK asked if Dr. Grinker made a test of pronation and supination, or the diadokokinesis test.

DR. GRINKER said he did, but this was inconclusive for localization.

DISCUSSION ON DR. BECK'S CASES.

DR. JULIUS GRINKER just wanted to say a word or two with regard to the last case shown by Dr. Beck, in which a diagnosis of trifacial neuralgia had been made. This man had been under Dr. Grinker's care, and he had put him down as a psychopath. The patient had been talking constantly about still having trouble in the frontal sinus, although he had been operated by competent men, and all signs of disease were found absent after repeated examinations. Dr. Grinker records him as a psychasthenic, with the habitual or psychic sort of pain. At the time of his examination he failed to find anything like a case of trifacial neuralgia. He fears that the results of injection of the Gasserian ganglion in his case will prove disappointing.

Dr. Grinker said he was the first one in America to attack the Gasserian ganglion by the Härtel method, at the County Hospital, and he is very loath to resort to this method unless all peripheral injections have been unsuccessful, for the reason that there is always the real danger of causing corneal ulceration when the Gasserian ganglion injection is successful.

Dr. Grinker had seen the young lady with hysteric hydrorrhea nasalis when she was presented to the society last year. At that time there were absolutely no characteristics of the type of rhinorrhea one finds in connection with neoplasm of the brain, or with extensive intraventricular conditions. So that by a mere process of exclusion he could make the diagnosis of hysteria. He thought that the remarks made in her presence when she was first presented to the society had done a great deal for the girl—that is, the psychotherapeutic treatment was unconsciously practiced. All the other treatments

applied afterwards by Dr. Beck had merely a supporting effect, the principal task having been accomplished when she was presented as a case of hysteria that would surely get well. Time and again the speaker has seen patients who were made worse with each consultation, because of the poison that was instilled into their minds as to the existence of organic disease. When we know that patients have no organic disease, we should tell them so.

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